THE JOURNAL

OF THE

Department of Agriculture.

VOLUME 2, No. 5. | WELLINGTON, N.Z., 15TH MAY, 1911. | PRICE, SIXPENCE.

TREFOIL AND BURR CLOVER SEED.

THEIR USE AS ADULTERANTS.

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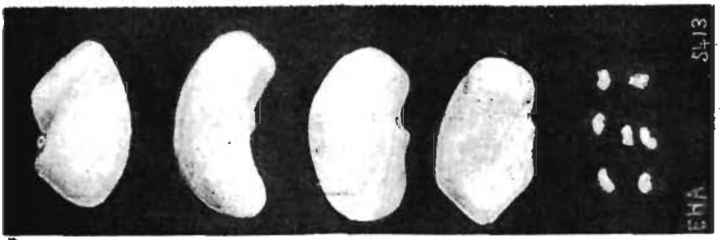
A KNOWLEDGE of the seeds of English trefoil and the burr clovers is of some importance to farmers, inasmuch as they are frequently used for the purpose of adulterating lucerne. English trefoil is, of course, regularly sold under its real name, and is a valuable clover under certain conditions. In lucerne-growing, where freedom from weeds likely to choke out the young plants before these are properly established is of prime importance, the sowing of lucerne containing seed of any plants likely to damage the young crop is an extremely bad policy. The burr clovers, owing to their rapid growth after germination and spreading nature, are likely to cause quite serious damage when introduced into lucerne-plots through the medium of adulterated seed.

With regard to the impurities, other than clovers, likely to be in a sample of lucerne, their presence can be easily detected by a casual examination, as they are at first glance readily distinguished from the true lucerne-seeds. Samples containing an excess of such material would naturally be rejected,

but in the case of trefoil and the burr clovers their presence is by no means so easily detected, as their seeds resemble those of lucerne to a marked degree. If the characteristics of the seeds were not known it would be possible for any one to buy lucerne under the impression that it was almost pure seed when in point of fact it might be mixed with trefoil or burr clover to the extent of 30 or even 40 per cent. With the exception of lucerne, the adulteration of farm seeds is rarely attempted at the present day, but the close resemblance of trefoil and the burr clovers to that of lucerne is too great a temptation to a certain class of dealer, especially when the price of lucerne is high. European- and American-grown lucerne appears to be most often adulterated, the practice being more or less unknown with regard to Australian- and New-Zealand-grown seed. Trefoil is very often employed, thirty or more per cent. being added to the lucerne in many cases. In the case of the burr clovers the mixing is nearly always done in Europe, where the seed is a by-product of carding-machines operating Argentine and Chilean wool. The following drawings and descriptions of the various seeds should enable any one to detect any cases of adulterated lucerne.

LUCERNE-SEED.

Lucerne-seeds vary considerably in size and shape, and this renders the presence of adulterants difficult of detection. Good seed is often of a decided greenish hue, but the general colour is a brownish yellow. Dark-brown and shrivelled seeds are indicative of age or bad-weather conditions during harvesting, and samples containing many such seeds should be avoided. In shape there are two main types—the kidney-shaped seeds, which are developed in those portions of the pods where the pressure during growth



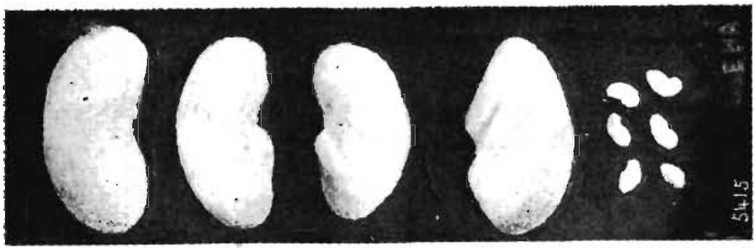
LUCERNE-SEED.

is least felt; and the shorter, wider seeds, that are developed where the pressure is greatest. Some seeds are even more or less triangular in outline. The seed-scar is very evident and situated near the centre of the seed, and a projecting point, marking the root-tip of the embryo, is sometimes developed just above the scar. The short, wide seeds are often quite decidedly truncate at the larger end. The kidney-shaped seeds are the longest, varying from $\frac{1}{16}$ in. to $\frac{1}{12}$ in.; while the irregularly shaped ones are generally smaller, some being as short as the $\frac{1}{15}$ in. In width there is not so much

variation, the average being about $\frac{1}{17}$ in. The percentage of hard* seeds is often high,† and for this reason Stebler‡ has advocated the keeping of lucerne for two or three years before sowing, provided the seed is well matured. Exclusive of the hard seeds, which should not be more than 12 per cent., lucerne should germinate about 95 per cent. The percentage and variety of weed-seeds§ vary considerably according to the country of origin, but should not exceed more than 2 per cent. of those that are not likely to seriously injure the growth of the plants. The number of seeds per pound varies from 180,000 to 240,000 seeds ; 220,000 can be taken as the average. Most of the seed is imported, and of either Australian or Continental origin, and a small quantity of seed is harvested in the Blenheim district. The majority of the European samples are sold as Provence seed, irrespective of what country they come from.

TOOTHED BURR CLOVER (*Medicago denticulata*).

The seeds do not vary as much as lucerne in size and shape, but considerable differences occur in individual seeds. The colour of properly matured seed is of a clearer yellow than lucerne, and never appears to have a greenish hue. Dark-brown, or even black, seeds are often met with, but when used as an adulterant care is taken to select samples which do not



TOOTHED BURR CLOVER SEED.

contain too many very dark-coloured seeds, as their presence is readily detected. The seeds are generally more or less kidney-shaped. The notch at the scar is generally well marked and developed near the centre, but the projecting end of the root-tip rarely ends in a distinct point. They are in general longer and thicker than lucerne-seeds, but occasionally may be the same size or even smaller. The ends are mainly rounded, but slightly truncated seeds are met with. In length they vary from $\frac{1}{6}$ in. to $\frac{1}{12}$ in., the

* Hard seeds are those which do not allow the entry of water when wetted, and accordingly do not germinate unless specially treated, or until the impervious tissue becomes disorganized.

† Ewart has shown that Australian-grown lucerne may have 4 per cent. of hard seed (Journal Victorian Department of Agriculture, Vol. VIII, p. 779 ; 1910).

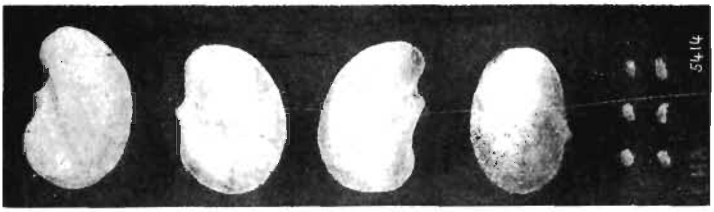
‡ Stebler and Schroeter : "The Best Forage Plants," p. 154.

§ The weed-seeds of lucerne will be dealt with in a future number of the *Journal*.

majority being about $\frac{1}{8}$ in. by $\frac{1}{14}$ in. in width. Lucerne-seed adulterated with the burr clovers occasionally has small pieces of steel present that have been broken off the carding-machines and have become entangled in the seed-pods as they were being removed from the wool. Toothed burr clover seeds are much heavier than lucerne, and 100,000 seeds is about the average number per pound. The seed is rarely sold commercially, except in some of the western portions of the United States and in South America, where it is often called "Buenos Ayres alfalfa."

ENGLISH TREFOIL (*Medicago lupulina*).

The seeds being developed singly in the pods, there is not very much variation in shape, the main difference between the individual seeds being in size. The general colour closely resembles lucerne, but is usually brighter: old seed is, however, almost undistinguishable in colour. Some of the seeds if harvested early have a more decided green tinge than lucerne, but the general colour is brownish-yellow. In shape the seeds are more or less oval or egg-shaped in outline, and are slightly notched near the scar, which is situated towards the smaller end of the seed. A slight protuberance marking the root-tip of the embryo is nearly always present, terminating just above



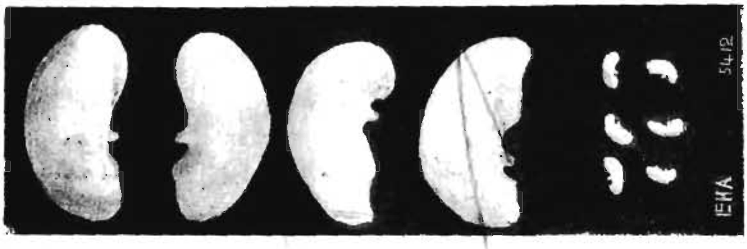
ENGLISH TREFOIL-SEED.

the scar; the larger end of the seed is nearly always rounded and not truncate, as in the short lucerne ones. The oval shape readily distinguishes them from the reniform seeds. In size the seeds vary from $\frac{1}{12}$ in. to $\frac{1}{20}$ in. in length, the average being about $\frac{1}{16}$ in. long by about $\frac{1}{20}$ in. broad. A few of the seeds may have the pods attached, and where the lucerne has been badly adulterated the black reniform pods are easily seen and serve as an indication that trefoil-seeds have been added. The hard seed average about 10 per cent., and the germination of the remainder should be about 94 per cent. The number of seeds per pound averages 320,000. The seed is all imported, none being harvested in New Zealand. In certain seasons it is very cheap in Europe, and it is then that it is liable to be mixed with lucerne.

SPOTTED BURR CLOVER (*Medicago maculata*).

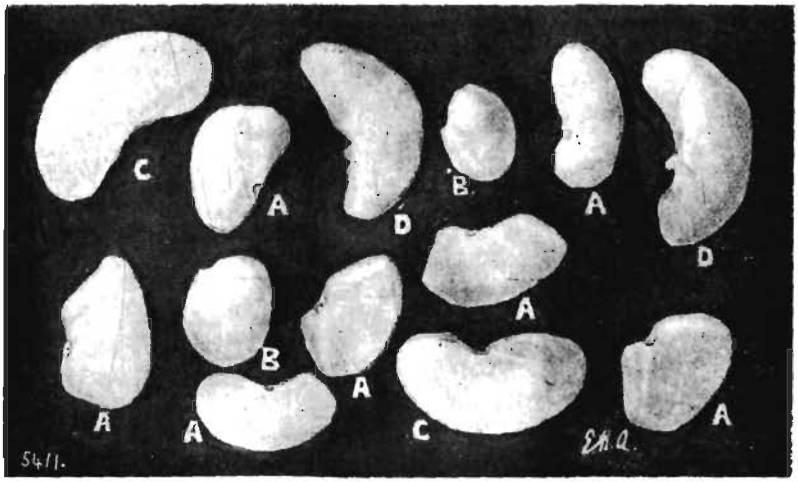
The seeds do not vary to any great extent. In colour they resemble the toothed burr clover very closely, but very dark, almost black, seeds

are not so common. They are distinctly kidney-shaped, and the scar is situated much nearer one end than in either lucerne or toothed burr clover. The protuberance marking the root-tip is very distinct, and stands out as a little projection just above the scar, almost at right angles to the long axis of the seed. This character makes it easily distinguishable from lucerne, and its presence should be easily detected. In size the seeds vary from $\frac{1}{8}$ in to $\frac{1}{14}$ in. in length, and the scar marks the narrowest portion. The



Spotted Burr Clover Seed.

number of seeds per pound varies considerably, but the average is about 130,000. The seeds are rarely as common in adulterated lucerne as either trefoil or toothed burr clover. The burrs, as has been pointed out, do not adhere to wool as easily as the latter, and are therefore not so numerous in South American wool. The seed is rarely sold commercially, but there is a slight demand for it in California for cover-cropping in orchards, for which purpose it is particularly adapted.



Burr Clover, Lucerne, and Trefoil Seeds.

A. Lucerne. B. English Trefoil. C. Toothed Burr Clover. D. Spotted Burr Clover.

THE DAIRY COW.

JUDGING MILKING-POWER ON FORM.

LESSONS FROM THE FRENCH.

IT is rather an anomaly that while the milking breeds of French cattle are not distinguished for heavy milk-yielding characters—though one race played a not altogether unimportant part in the formation of Channel Island stock--French investigators of dairy stock have studied more deeply the dairy qualities of cattle, and have given more knowledge to the world on this important problem, than the people of any other race or time. Not only Guénon with his remarkable escutcheon theory, but several other observers, have evolved systems of determining a cow's milking-power on external signs and indications which the ordinary farmer may acquire and apply. Several countries, such as the Channel Islands, Holland, and Britain, have evolved races of milking-stock which are world-famous, but in none of these countries has the knowledge of judging the dairy qualities of cattle passed beyond the simple rules of determining type which are obvious to the intelligent student. The several French systems still, however, remain largely in the theoretical stage, though there are to be found in this country disciples of Guénon who regard his remarkable escutcheon method of judging as a practical guide to milking-quality. The work of the French in this connection is of so much interest to our milk-producers, especially their sound reasoning in regard to the milk veins and the "fountain," that a late treatise on this subject by a noted French veterinarian is published for the benefit of readers of the *Journal*. It has been translated by Mr. H. A. Reid, F.R.V.S., D.V.H. The author is Émile Thierry, veterinary surgeon, correspondent to the Academy of Medicine and to the National Agricultural Society of France, &c. The article reads :—

"I shall endeavour to describe the characters which should be possessed by every good dairy cow irrespective of any particular breed. If possible it is first of all necessary to assure one's-self of the pedigree, good milking-qualities being hereditary. The dairy cow should be in moderate condition, neither too fat nor too lean, fine in the bone, with well-formed short legs, and ample girth round the chest. The latter point may often be masked on account of the voluminous abdomen. The shoulder straight, short, appearing well detached from the chest-wall, and with good muscular develop-

ment. Croup broad and long, indicating well-developed pelvis, and leaving a separation of the thighs sufficient to easily allow room for the milk-vessel. The tail, more or less long according to breed, should be slender. The head also should be fine, and move freely ; the horns glossy and smooth ; the ears large, all but hairless, and the interior aspect waxy. The skin should be yielding and easily lifted from the subcutaneous tissue ; although as a rule thin, one often finds it more or less thick, but invariably flexible. A gentle expression, the eye alert, and a docile and quiet disposition, are excellent characteristics. Nervous, touchy, and irritable beasts are to be rejected in spite of their other qualities, for they retain their milk or are difficult to milk, and sometimes are dangerous. Cows termed "taurelières" or "nymphomaniacs" are the worst dairy animals. A good cow is sound, and eats well. The state of health is indicated by the appetite, regular rumination, muffle soft and moist, the pink colour of the visible mucous membranes, the coat glossy, bright, and slightly greasy. Pinching the vertebral column behind the shoulders causes the animal to give way somewhat. Respiration is regular and slow (fifteen to eighteen movements to the minute) ; no discharge comes from the nostrils, and there is no cough. The gait is easy.

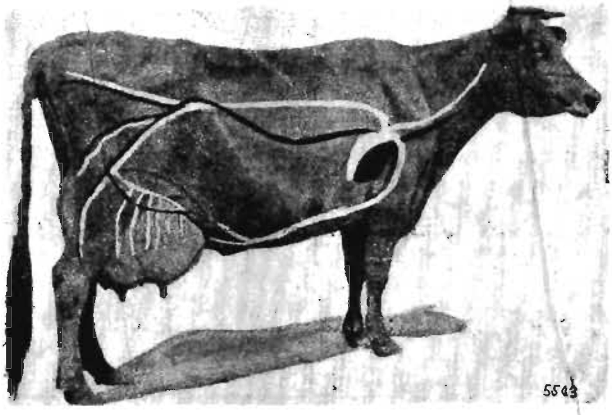


DIAGRAM SHOWING THE BLOOD-CIRCULATION SYSTEM OF A COW, WHICH INDICATES THE IMPORTANCE OF A WELL-DEFINED ABDOMINAL VEIN AND A LARGE "FOUNTAIN."

The udder should be ample and project well between the thighs, extending beyond the front and back profile of the leg, and prolonged as far as possible under the abdomen. The skin is smooth, easy to fold or double, slightly adherent to the subcutaneous tissue, covered with fine silky hairs of a saffron colour, soft and slightly greasy to the touch. The teats are of medium size, and form a square. To the touch the good teat is spongy ; on pressing lightly with the fingers one feels the mammary granulations, supple, elastic, and numerous. The udder examined before or after milking yields different sensations. Before, it is rather firm, distended, and is intent ; after it is less voluminous, soft, and flaccid. Well formed

udders are symmetrical, and pleasing to the eye. Examination of the circulatory system of the udder gives important indications, from whence the importance in examining the veins, always proportionate to the arteries, which are very difficult to explore. If the mammary veins immediately under the skin are well developed and sinuous, it shows that the arteries are supplying to the udder a large quantity of blood corresponding to the secretory activity. Besides the subcutaneous mammary veins, which are very numerous, quite apparent, and flexuous, one sees in front of the udder on each side, and winding under the abdomen, a large vein which enters the abdominal cavity at the level of the xyphoid appendix of the sternum. These two veins are always voluminous, sinuous, and outstanding in good cows. They are easy to feel, and readily perceptible. The openings by which they enter the abdomen, called 'fountains,' or 'milk-portals,' are large, and allow of the introduction of the first finger. The circulatory activity of the udder is further appreciable by the volume of the perineal veins, which, leaving its posterior portion, ascend on either side as far as the vulva. These veins, less apparent than those of the abdomen, are distinguishable by palpation, and are never visible in the ordinary dairy cow. Guénon, a careful observer, remarked that, contrary to the veins of the rest of the body, those of the perineal region were directed from below upward. From this disposition the limitations of the perineum and buttock are definable. There is a visible tuft bounding this aspect, where the hairs are laid from below upward. This surface goes by the name of the 'escutcheon.'

"It is from this that we can obtain information, according to its form and dimensions, on the excellence or otherwise of milch-cows. In 1828 Guénon founded a system based on his observations, of which the physiological meaning has been scientifically expounded by A. Sanson, and confirmed by all zootechnicians. The dimensions of the escutcheon indicate the degree of milking-qualities of a cow. The higher and larger the escutcheon the better the milking-qualities of the cow. However, Mausuy, of Remiremont, has added that not only is it of importance that the face of the escutcheon should be expanded, but, further, that the more regular the pattern the better the cow. The dimensions and form of this perineal surface are, in fact, proportionate to the volume and sinuosities of the posterior mammary veins. But the escutcheon is only of value in estimating the two posterior quarters of the udder, the sub-abdominal mammary veins indicating only the activity of the two anterior quarters.

"Besides diagnosing the disposition as regards the quantity of milk, it is also necessary to determine approximately, by examination of a cow, the quantity of butter she can furnish. Obviously, the most certain means of ascertaining the quality of milk in respect to the dry matter, and particularly the fatty constituents, is to seek for them directly. But that is not the

point when a cow is brought before one to tell, after examination, if her milk is rich in butter-fat. This problem is easily solvable, and is not lacking in interest. Another practitioner, Renoult-Lizot, has discovered that the buccal papillae, which are highly developed in the large ruminants, assume diverse forms according to whether the beast is good, passable, middling, or a bad butter-producer. If these papillae, which one finds on the inner surface of the cheeks of a cow, and more particularly at the commissures of the lips, are large, wide, and flat, the beast is a good butter-maker; should these papillae be only rounded at their ends, the butter-making qualities are ordinary; on the other hand, the cow is a poor butter-producer if the papillae are pointed. I can affirm that in the majority of cases the Renoult-Lizot system gives satisfactory results. Another older proceeding permits of predicting the butter-yielding qualities of a dairy cow. One knows that the udder is an enormous sebaceous gland; that if the mammary secretion is suspended from whatever cause, the elimination of the fatty material takes place in some other part of the body. It is the rule, in fact, that cows affected with mammitis display on the face, and particularly around the eyes, a yellow tint due to the production of a coating of sebum which can be removed with the nail. Without running the risk of serious error, one can advance the theory that there is a correlation between the sebaceous secretion of the skin and the proportion of butter contained in the milk. When the skin in those regions where it is hairless, around the anus and vulva, is rich in sebaceous glands, when it displays the colour of fresh butter more or less dark, provided that the beast is in other respects in a perfect state of health, one can look upon her as a good butter-producer."

CRUTCHING.

None of the ewes were "crutched" at Moumahaki Farm this year, and I consider (reports the Manager) that among small flocks this custom may be advantageously dropped, as the crutching removes the protection from a very tender part of the body at a time when it is specially required. "Turning up" the ewes for "dagging," &c., was also avoided as much as possible, although I do not consider that this does much harm if only carefully gone about. On several exceptionally rough nights during the lambing season a few deaths occurred among the newly dropped lambs. This emphasizes the necessity for erecting temporary shelters in the lambing-paddocks. A few double rows of wire netting—the space stuffed with straw—makes a capital breakwind, especially when made in the form of a cross.

In 1909 Great Britain bought from the Argentine food—wheat, beef, mutton, &c.—to the value of £27,000,000 and from the United States £50,000,000 worth. The proportion of the former's supply is increasing, but that of the latter is decreasing.

should disappear. The three days on which the milk was not weighed are credited with the average yield. The cows were pastured a few days on each plot and moved on to another.

Twelve cows were grazed on the 9¾ acres (three plots) during the whole of the three months. Of this number only six were tested, the others not being in a suitable stage for that purpose. The grass on each plot was grazed as equally as possible. It will be seen from the following table that the unmanured plot carried the twelve cows a much shorter period than the manured plots, and yet, if anything, it was always the barest. The six cows tested were giving slightly over their average flow, and all were in calf, so that the periods of coming in season could not affect the yields of milk. The object of employing a greater number of cows than was tested was to test the full grazing-capacity of each plot. The table on the opposite page shows the results in full :—

As the experiment is only in its infancy, it would be somewhat unfair to summarize on the above results. The experiment is at present at a standstill, as another is being carried out with various forage crops at the request of the Eltham Farmers' Union.

Perhaps it would be still more interesting if an additional plot were fenced off and top-dressed with a nitrogenous fertilizer. One point is perfectly clear—namely, that basic slag has almost immediate results—despite many opinions to the contrary. This fact is also abundantly proved in this year's root-crop.

TAILING AND CASTRATING.

No deaths occurred among the Moumahaki Farm lambs as a result of "tailing" and castrating this season. These operations were carried out at three times, when the lambs were from a fortnight to a week old. In each case the lambs were drafted from the ewes and allowed to settle down for two or three hours before being operated on. The docking was done with a sharp knife. It has yet to be proved (remarks the Manager) that the searing is a better plan; in fact, the bleeding is an advantage, especially when the lambs are in a very high condition. The castrating was done with the Bowater instrument, which is undoubtedly a great improvement over the old filthy method of drawing with the teeth. As each lamb was operated on, the ends of the scrotum and tail were touched with a soft paint-brush saturated with a solution of lysol. The docking-knife and castrating-instrument were also regularly dipped in this solution.

In the beginning of March the historic herd of Shorthorn cattle owned by Mr. Richmond Booth, of Warcaby (Yorkshire, England), the home for more than a century of the Booth strain, was disposed of to make way for a herd of dairy cattle—a rather significant fact.

Plot No.	Fertilizers per Acre.	Cost per Acre.	Cost per Plot.	Number of Days grazed.	Yield per Cow per Day.	3 Months' Yield per Cow, per Plot.	3 Months' Yield on the Supposition that all 12 Cows are milked.	Financial Gain per Cow for 3 Months by Manuring. (Milk valued at 6d. per Gallon.)	Total Financial Gain for 3 Months by Manuring.
		£ s. d.	£ s. d.		Lb.	Lb.	Lb.	£ s. d.	£ s. d.
1	Unmanured	..	..	24	22	528	6,336	..	..
2	Ground unburnt limestone, 10 cwt.; superphosphate, 2 cwt.; sulphate of potash, 1 qr.	1 1 6	3 9 10	34	24	816	9,792	0 8 7	5 2 11
3	Basic slag, 3 cwt.; kainit, 1 cwt.	1 0 6	3 6 7	34	25	850	10,200	0 10 6½	6 6 8

BOVINE TUBERCULOSIS.

FINDINGS OF INTERNATIONAL COMMISSION.

AT the 1909 meeting of the American Veterinary Medical Association an International Commission on Bovine Tuberculosis was constituted. It comprised the leading veterinary and meat authorities of the United States and Canada. An exhaustive inquiry resulted in regard to reasonable and economically practicable methods or systems to be recommended to both officials and live-stock owners for eradicating this great scourge of domesticated animals. The first report of the Commission has just been published. Appendix E, the Commission's recommendation on eradication, reads as follows :-

The Commission, after stating the known facts regarding the nature of tuberculosis and enumerating the principles to be observed in its prevention and eradication, recommends the following plan of procedure. It is recognized that in several points there are opportunities, in order to meet individual needs, to change or modify the directions herein given. It is understood, however, that whenever such modifications are made they should conform in the greatest detail to the principles laid down in the report of this Commission. The plan has for its purpose the conservation of the herd whenever that is possible.

The control of bovine tuberculosis involves a definite procedure under two distinct and different conditions, namely: (1) Where a herd of cattle is free from tuberculosis and is to be kept so, and (2) where one or more animals in the herd are infected and the purpose is to eradicate the disease and establish a sound herd.

PROCEDURE UNDER CONDITION (1).

The prevention of tubercular infection in cattle free from tuberculosis consists simply in keeping tuberculous cattle or other animals away from the sound ones; in keeping tuberculous animals out of pastures, sheds, or stables where the sound ones may be kept. Healthy cattle should not be exposed to possible infection at public sales or exhibitions. Raw milk or milk by-products from tuberculous cows should not be fed to calves, pigs, or other animals. Cars that have not been thoroughly disinfected should not be used for the transportation of sound cattle. Cattle that are purchased to go into sound herds should be bought from healthy or sound herds only.

PROCEDURE UNDER CONDITION (2).

The eradication of tuberculosis from infected herds requires for conservation of the herd different procedures according to the extent of the

infection. For a guide to the control of the disease tuberculous herds may be divided into three groups, namely :—

1. Where 50 per cent. or more of the animals are infected.
2. Where a small percentage (15 per cent. or less) of the animals are affected.
3. Where a large number (15 per cent. to 50 per cent.) of the animals are diseased.

In eliminating tuberculosis from infected herds the following procedure is recommended :—

GROUP 1.

Herds where a tuberculin test shows 50 per cent. or more of the animals to be infected should be treated as entirely tuberculous. The procedure here is as follows :—

1. Eliminate by slaughter all animals giving evidence of the disease on physical examination.

2. Build up an entirely new herd from the offspring. The calves should be separated from their dams immediately after birth, and raised on pasteurized milk or on that of healthy nurse cows. This new herd must be kept separate from any reacting animals.

3. The young animals should be tested with tuberculin at about six months old, and when reactors are found at the first or any subsequent test the others should be retested not more than six months later. When there are no more reactors at the six-months test annual tests should thereafter be made. All reacting animals should at once be separated from the herd. and the stables which they have occupied thoroughly disinfected.

4. When the newly developed sound herd has become of sufficient size. the tuberculous herd can be eliminated by slaughter, under inspection, for beef.

GROUP 2.

1. The reacting animals should be separated from the non-reacting ones and kept constantly apart from them at pasture, in yard, and in stable.

(*a.*) *Pasture.*—The reactors should be kept in a separate pasture. This pasture should be some distance from the other, or so fenced that it will be impossible for the infected and non-infected animals to get their heads together.

(*b.*) *Water.*—When possible to provide otherwise, reacting cattle should not be watered at running streams which afterwards flow directly through fields occupied by sound cattle. The water from a drinking-trough used by infected animals should not be allowed to flow into stables, fields, or yards occupied by sound animals.

(*c.*) *Stable.*—Reacting cattle should be kept in barns or stable entirely separate from the ones occupied by the sound animals.

2. Calves of the reacting cows should be removed from their dams immediately after birth. Milk fed these calves must be from healthy cows ; otherwise, it must be properly pasteurized. These calves should not come in contact in any way with the reacting animals.

3. The non-reacting animals should be tested with tuberculin in six months, and when reactors are found at the first six months, or any subse-

quent test, the others should be retested not more than six months later. *When there are no more reactors at the six months' test, annual tests should* thereafter be made. All reacting animals should at once be separated from the new herd, and the stables which they have occupied thoroughly disinfected.

4. The milk of the reacting animals may be pasteurized and used.

5. Any reacting animal which develops clinical symptoms of tuberculosis should be promptly slaughtered.

6. An animal that has once reacted to tuberculin should under no circumstances be placed in the sound herd.

7. As soon as the sound herd has become well established, infected animals should be slaughtered, under proper inspection.

Group 3.

Herds that come within this group should be dealt with either as in Group 2, where the herd is separated, or as in Group 1, where all of the animals are considered as suspicious, and an entirely new herd developed from the offspring.

General Precautions.

In all cases, animals that show clinical evidence of the disease should be promptly eliminated. They should be destroyed if the disease is evidently far advanced; if not, they may be slaughtered for food under proper inspection.

All milk from tuberculous cows that is used for food purposes should be thoroughly pasteurized. This means that it must be heated sufficiently to kill or to render harmless any tubercle bacilli that may be present in it. For this, it is necessary to heat the milk for twenty minutes at 149° Fahr. or for five minutes at 176° Fahr. It is important that pails or other utensils used in carrying the unpasteurized milk should not be used, unless previously sterilized, for storing the milk after it is pasteurized.

When diseased animals are found, the stables from which they are taken should be thoroughly cleansed and disinfected. To accomplish this, all litter should be removed; floors, walls, and ceilings carefully swept, and the floors, together with mangers and gutters, thoroughly scrubbed with soap and water. Thorough cleansing before the application of the disinfectant cannot be too strongly emphasized. After cleansing, the disinfectant should be applied. A 5-per-cent. solution of carbolic acid, a 1-1000 solution of corrosive sublimate, or a 4-per-cent. solution of sulphuric acid may be used.

When the stable can be tightly closed, formaldehyde gas properly used is reliable and satisfactory.

If tuberculous cattle have been kept in a small yard, the litter should be removed, the surface ploughed, and the fencing and other fixtures thoroughly cleansed and disinfected.

So great was the increase in the use of artificial fertilizers in Ireland last year—due to the greater area under tillage and the influence of the work of the Department of Agriculture—that manufacturers experienced considerable difficulty in coping with orders for supplies.

AUSTRALIAN DAIRY CATTLE.

THE ILLAWARRA SHORTHORN.

J. DRYSDALE.

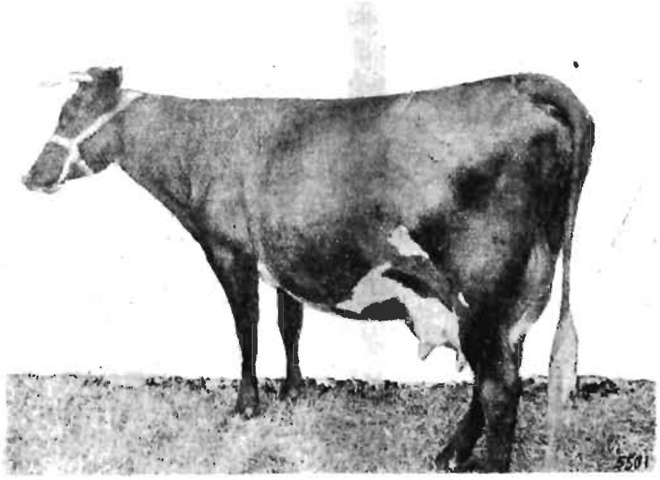
WHEN compared with other countries where dairying plays a prominent part, New Zealand is seen to possess advantages which make it unrivalled for the economic production of milk. This fact is strikingly emphasized by a visit to the dairying districts of the Commonwealth.

The first thing that struck me on a recent visit to Australia was that, even where feed was abundant, the conditions were obviously very trying to cattle at pasture. Instead of the rich fields of grass and the temperate climate of New Zealand, in which cows can feed and rest in comfort, the grazing-stock has to contend against a trying temperature and annoying insects—flies, &c. It would certainly appear under the circumstances that milk-producing is not as profitable to the Australian as to the New Zealand dairy-farmer. Another factor which tells against Australian dairy cattle doing their best from season to season is the great variation in the food-supply throughout the year. It is too often the case that the summer is very hot and the feed scarce, while when good rains come the feed conditions are at the other extreme—a rank succulence. Of course, many farmers provide special feed for their stock, and the practice is growing, but even then there is not, taking season by season, the same continuance of favourable conditions for dairy herds as is usually the case in this country. In every way the climate of the Commonwealth is a severe one on heavy-milking cattle. I was informed that cows imported from New Zealand seldom did well during their first year's experience of Australian conditions, chiefly owing to the more trying climate, as well as to the fly trouble ; and I could quite understand it.

Taking the dairy cattle of New South Wales and Victoria as a whole, there is nothing in the recognized special milking breeds which stands out as worthy of comment. Here and there there are individual Jerseys, Holsteins, and Ayrshires of striking quality, but they are the exception rather than the rule. Some of the Ayrshires are better than are to be found in this country, but probably a finer collection of both Jersey and Holstein cows could be brought together in New Zealand. A breed which is promising to supersede any of the above dairy types, in New South Wales especially, is the Guernsey, which is fast becoming very popular, a Herd Book Society for the breed

of Agriculture there are Shorthorns, Jerseys, Ayrshires, Holsteins, and Guernseys, and the last-named are the most popular of all with the manager. This is not because the other cows are indifferent specimens of their respective breeds, for each of the herds includes distinctly typical animals, many of them of outstanding quality, but simply because the management has found the Guernseys to be the most satisfactory. They are heavier milkers than the Jerseys, and, if their milk is not so rich in butter-fat, the greater quantity of produce and their hardier and more placid natures fully make up for this. I consider they would be even more popular in this country.

The breed which proved the most interesting to me in Australia was that known as the Illawarra Milking Shorthorn, a dairy type of Shorthorn evolved in the south coast districts of the State from a Shorthorn-Ayrshire foundation,



A TYPICAL ILLAWARRA COW.

but now bred for about thirty years to a Shorthorn dairy type. Whatever critics may say of the Illawarra cow, it is certain that she can produce milk, and that she is a distinct dairy type which has been absolutely fixed. One very good point of the Illawarra is that while it is a heavy producer, the milk is generally of a very satisfactory butter-fat standard. The dairy-farmers responsible for her creation are proceeding on sound lines to maintain, and if possible improve, the special breed they have evolved. In the Herd Book Society formed of recent years performance as well as Illawarra type are laid down as the essentials to registration. A cow must be able to produce under supervision a certain yield of milk, but, no matter what the yield, if she cannot pass inspection as the type desired she is not considered to be eligible. When this sound system of advancing dairy type

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through a herd-book has progressed for a decade or so the Illawarra Shorthorns should be without a rival in Australia as utility milking-stock.

During my investigations in Australia I could only come to one conclusion, taking my own observations, the statements of disinterested parties, and what I could read, and that was that Illawarra cattle were head and shoulders above the other breeds when the general returns from the herds came to be averaged. There is not the same tailing-off as is usual with too many herds of the other special-purpose breeds—and it is, after all, the average rather than the work of a few exceptional animals which determines the value of a breed. Good as is the work the Illawarra cow is doing in its native environment, I am convinced it would show much greater returns under New Zealand conditions.

The Illawarra cow herewith illustrated is a very typical specimen, and hundreds, nay thousands, like her in every respect may be seen in dairy herds in New South Wales.

ILLAWARRA CATTLE.

The Minister of Agriculture, the Hon. T. Mackenzie, has decided to purchase two bulls of the noted dairy strain of Shorthorns known as Illawarra or South Coast dairy cattle of New South Wales. This breed has been evolved by careful selection from Shorthorn cattle crossed with Ayrshire stock, this foundation having been laid nearly four decades ago. A deep-milking type, of fixed character, has been evolved, and the purity of the breed is now assured. For its further security and advancement a special herd-book has been established. The bulls will be located at the Weraroa and Ruakura Experiment Farms, to be used with the dairy Shorthorns now at those centres. An interesting reference to the breed is made in the preceding article on Australian dairy cattle by Mr. J. Drysdale, Manager of the Weraroa Experimental Farm, who closely studied the Illawarra stock during the course of a recent visit to the Commonwealth.

MOUMAHAKI EXPERIMENTAL FARM.

One of the buildings at the Moumahaki Experimental Farm is being converted into a cow-byre for the milking of the Ayrshire herd being there established. The building lends itself admirably to its new purpose. It is well constructed, has a concrete floor, and permits of excellent drainage.

Britain's national bill for imported food, drink, and tobacco last year amounted to £257,788,416.

There is said to be a revival in the old breed of Dishley (English) Leicesters at Home.

FAT-LAMB EXPERIMENT.

AN INSTRUCTIVE TRIAL AT MOUMAHAKI.

PRIMROSE McCONNELL.

THE experiment initiated at the Moumahaki Experimental Farm in order to determine the relative market value of crossbred Border Leicester and Southdown lambs has been continued this season. Following is the result to date :—

The ewes employed, Lincoln-Romney cross, numbered 248. Half of these were mated to Southdown rams and half to Border Leicester rams. for the purpose of the experiment. The percentages of lambs were: Crossbreds mated to Southdown, 140 per cent.; crossbreds mated to Border Leicester, 116 per cent. The percentages are based on the number of ewes at the beginning of the mating season. Contrary to the general rule, the Southdown ram has this season proved more prolific than the Border Leicester.

On the 30th November the first draft of fat lambs was sold to the Waitara Freezing Company. As I considered the price offered per pound too low, each draft was sold at an average price per head, which worked out at slightly over the current price per pound.

The Border Leicester cross turned out slightly heavier than the Southdown, but were not as good quality -hence, worth a fraction less per pound. When the first draft was sold the remaining ewes and lambs were immediately put on to rape. In addition to the rape a liberal allowance of chaffed lucerne hay was given in racks. The lambs took to the latter feed at once, and seemed to relish it. The lambs were weaned after the second draft had gone, and undoubtedly from that date fattened more quickly than during the previous three weeks. It will be seen from the following table that the Southdown not only gave the best return per ewe, but also, as in former years, the lambs came soonest to maturity. The latter is a point much in their favour, as the ewes get away fat in good time and make room for other stock. I consider there is no doubt whatever that, looking at the Southdown ram from a purely fat-lamb standpoint, he takes premier place over all other breeds. Of course, where the lambs cannot be fattened, the longwools are far ahead of the Downs. This season Border Leicester, Southdown, and Dorset Horn rams are being used on Lincoln Romney

ewes. The Dorset Horns have already proved themselves to be good fat-lamb producers.

TABLE SHOWING NET PROCEEDS FROM EACH CROSS.

Date sold.	Number.	Price per Head.	Average Weight.	Net Proceeds.	Total Proceeds from 124 Ewes.
		Border Leicester.			
		s. d.	lb.	£ s. d.	£ s. d.
November 30 ..	47	13 0	32	30 11 0	
December 18 ..	29	13 0	29	18 17 0	
January 15 ..	41	12 6	31	25 12 6	
February 24 ..	30	12 6	30	18 15 0	
					93 15 6
		Southdown.			
November 30 ..	71	13 0	31	46 3 0	
December 18 ..	44	13 0	28	28 12 0	
January 15 ..	41	12 6	30	25 0 0	
February 24 ..	30	12 6	30	12 10 0	
					112 5 0

No culls were left on hand; all went off fat.

LAMBING TROUBLES.

THE entire absence of ante-partum paralysis and ante-partum extrusion of the vagina in the Moumahaki Farm flock this season I attribute (writes Mr. Primrose McConnell), to the fact that each day during the lambing season, and for a fortnight previous to it, all the ewes on the farm were quietly driven from one paddock to another three-quarters of a mile distant, and returned again at night, thus compelling them to take a sufficiency of exercise. The want of the latter is undoubtedly one of the causes of the above two diseases, as pointed out in the Departmental Veterinary Bulletin No. 15.

BORDER-LEICESTER EWE LAMBS AT MOUMAHAKI EXPERIMENTAL FARM.

FROZEN MEAT.

AN INTERESTING ADDRESS.

ALTHOUGH Great Britain is depending to a very considerable extent on other countries for its meat-supply, in great measure provided in a frozen state, unjustifiable prejudice still bars the way to a proper appreciation of frozen meat by a certain section of British consumers, especially of the high-grade quality which distinguishes a large percentage of the meat supplied to Home markets by the farmers of this country. To bring about a general regard for frozen meat as a wholesome article of diet is an essential service. It is therefore gratifying to know that Mr. Gilbert Anderson, the well-known representative of New Zealand meat interests in Britain, recently delivered an excellent address on frozen meat as a nutritious and healthy food-supply before the City Tradesman's Club, of London. Mr. Anderson briefly surveyed the history of the frozen-meat trade, and, having quoted several eminent authorities to prove the undoubted superiority of freezing as a means of preserving fresh meat, thus illustrates the high standard of the New Zealand product, and gives a merited advertisement for the complete system of meat-inspection and disease-control work in the Dominion, which is doing so much for the reputation of our meat. Mr. Anderson said :—

NUTRITIVE VALUE.

Mr. James Long was instructed by the War Office to test the respective values of British and frozen meat. Mr. Long interested the services of Dr. Bernard Dyer, president of the Society of Analysts. Thirty legs of wether mutton were taken for the experiments.

	Average Weight. Lb.	Average Weight. oz.	Average Nutritive Value. Per Cent.
5 Hampshire	9	15	35·6
5 Shropshire	10	4	40·7
5 Scotch	11	1	45·1
5 New Zealand	9	8	41·9
5 Australian	7	13	37·2
5 Argentine	8	1	38·8

It seems that the real nutritive matter in each lot of meat, home-grown and frozen, is almost identical.

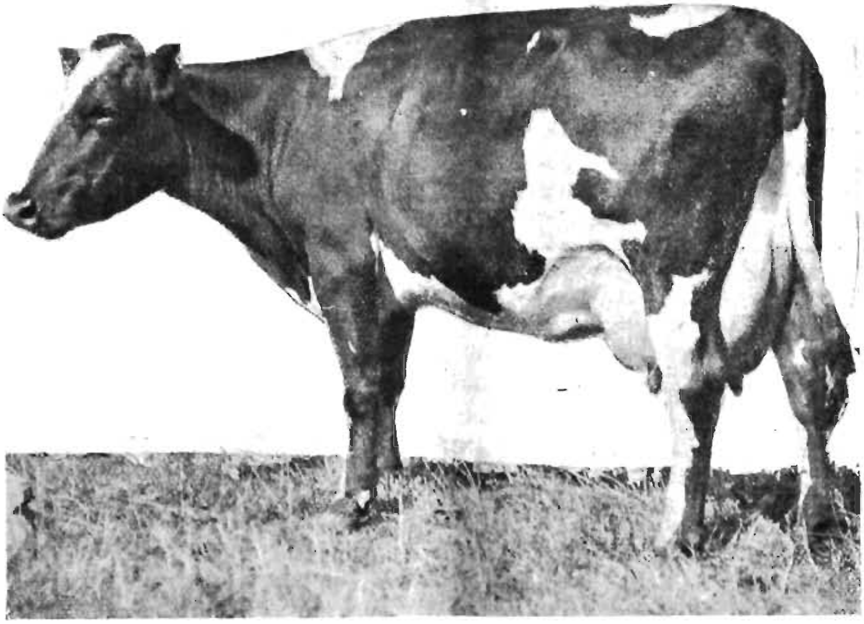
It has been shown that refrigeration applied to meat when in a healthy condition preserves in a natural form all the constituents of fresh-killed meat. It is necessary to know what are the conditions of the flocks and herds in the countries from which we draw our supplies, and, further, what are the regulations and laws (if any) under which frozen meat is killed for export.

In these countries there are millions of acres in the natural condition covered with native grass and herbage well suited for rearing sheep and cattle in a healthy and thriving condition. The Governments of these countries have not been satisfied to leave nature and man to unrestricted use of these opportunities. From the times of the early settlement laws were passed and regulations enforced to prevent the importation of stock other than in a healthy condition. But, further, in these countries the Agricultural and Stock Department is one of the most important and active branches of the State. The Minister of Agriculture occupies one of the principal positions in the Cabinet, and is usually a man of force of character, taking one of the leading parts in public affairs.

WHAT NEW ZEALAND IS DOING.

Taking New Zealand as an illustration, under the Minister of Agriculture there is an efficient and large staff of experienced inspectors and a well-organized bureau. The Dominion is divided into eight divisions, under superintending officers, all being qualified veterinary surgeons, whose duties include the investigation of disease, the supervision of the work of Inspectors of Stock and Dairies, the furnishing of expert advice and assistance to these officers, supervision of meat-inspection, and the giving of advice and rendering of assistance to stockowners generally. The number of stock-inspection districts is thirty-two, with a staff of inspectors whose whole time is devoted to the inspection of stock, dairies, and slaughterhouses. In addition to the above, there is a large staff of inspectors at the meat-works, some of whom during the slack period, when the exportation of meat ceases, are employed in the inspection of live-stock, dairies, and general field-work. Under such an efficient system the health of the stock is well assured.

The stockowner is rendered every assistance and advice, and, should at any time the task of clearing his stock from disease be greater than the owner can affect, the Government then take the matter in hand and clear the stock. In the event of an owner having his herd tested with the tuberculin test, of all animals which react and are destroyed he is paid half the value. Under such regulations it will be readily recognized that the live-stock in these countries are kept in a healthy and sound condition and under thorough inspection. Further inspections take place when stock comes to the sale-yards for disposal.



MARY.

The Noted Crossbred Cow of the Weraroa Experimental Farm Herd.

This little cow has given for four complete seasons and the present season to the end of April (she is still milking) 62,189 lb. of milk and 2,350·7 lb. of butter-fat.

HOLSTEIN CATTLE.

HOME OF THE BREED AN INFECTED AREA.

Holland, the home of the deep-milking Holstein cattle, still possesses very good herds of the native breed, but at the same time there is a great deal of disease in the country—for instance, foot-and-mouth disease exists to a menacing extent. In view of this fact the British Government absolutely prohibits the entry of live-stock from Holland under any circumstances. In connection with the recent outbreak of foot-and-mouth disease in Great Britain, the Director of the Live-stock and Meat Division, Mr. C. J. Reakes, has been in close touch with the position with a view of taking steps, if necessary, to safeguard the interests of stockowners in this country. It is satisfactory to note that the outbreak in question has been completely stamped out, and that the disease did not spread beyond the place where it first broke out. Information received points to the fact that the infection probably reached England from Holland. It has to be borne in mind that not only cattle, but fodder—hay, straw, &c.—and, possibly, human beings also, may be the medium by which infection is carried. Hence exceptional care has to be taken to guard against the possibility of foot-and-mouth disease being introduced to this country.

STOCK IN QUARANTINE.

The following stock was received into quarantine during the month of April :—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
			Motuihi Island (Auckland).		
7	Romney ..	Ewes ..	London ..	E. Mitchelson ..	Auckland.
6	Holstein ..	Bulls	Sydney ..	Dalgety and Co. ..	"
2	" ..	Heifers			
1	" ..	Bull ..	" ..	T. W. Discombe ..	"
			Somes Island (Wellington).		
2	Hereford ..	Bulls ..	Sydney ..	Hugh Campbell ..	Hastings.
1	Jersey ..	Bull ..	London ..	Healy, Bayly, and Hancock	Stratford.
			Quail Island (Lyttelton).		
10	Angora goats	Female ..	Melbourne	Pyne and Co. ..	Christchurch.

THE NEW KAUPOKONUI CHEESE-FACTORY.

THE Minister of Agriculture, the Hon. T. Mackenzie, laid the foundation-stone on the 29th of last month of the Kaupokonui Co-operative Dairy Company's central cheese-factory, which is to replace the original building destroyed by fire. The new factory will be a model of its kind. It will be constructed of reinforced concrete, and is notable for the method on which it is planned, which will enable the manufacturing process to be conducted in the most effective manner at a minimum of cost. The manufacturing-rooms for both butter and cheese are spacious, and are designed on the most sanitary principles. A special feature of the building is the arrangement for curing the cheese at a desired low temperature. The floor of the curing-room is at a lower level than the main building, and the walls of the room are properly insulated, while provision is being made for cooling by artificial means when necessary. The site enjoys the advantage of having effective water-power at hand for driving the machinery, a factor which will enable the company to take full advantage of the economic principle of utilizing the butter-fat in whey for the manufacture of butter. When the building is completed it should present a very attractive appearance, and should be one of the most up-to-date factories in the Dominion.

In constructing such a solid and well-planned factory the Kaupokonui directors have set an admirable standard for dairy-factory directorates in general who may have to undertake the work of reconstruction.

In speaking at the ceremony of laying the foundation-stone the Minister congratulated the shareholders of the company on their progressive spirit, emphasizing the need of modern methods in conducting an industry which was now of such great importance to the welfare of the Dominion.

SHEEP-DIPPING.

BEFORE winter weather finally sets in sheepowners should make sure that the season's dipping operations have been effective—that the sheep are free from vermin. If upon examination they have reason to believe that the flock is not clean it is not yet too late to dip. Settled weather, however, should be chosen for the work. A little cold will do no harm, so long as the days are warm and bright, but every care should be taken not to have the sheep heated in bringing or taking them from the dipping-yards.

CROPS, PASTURES, AND STOCK.

Owing to the dry weather in Canterbury the area sown in that province in oats and barley, for early winter feeding, is on a more than usually extended scale, late rains having enabled farmers to take full advantage of this means of providing early feed, vitally necessary owing to the comparative failure of root crops in the autumn, due to unfavourable meteorological conditions which restricted growth and offered favourable conditions for the development of insect pests. It may be expected that root crops, except in Southland and in some of the lower and heavier lands of Canterbury, will not be more than an equivalent of 25 per cent. of the usual return; and over a very great portion of the North Island the same unfortunate condition prevails. A farmer who has made a practice of producing roots for winter feed advises the Department that from 150 acres he will not have a yield more than equal to a 25-acre crop of a normal season.

The persistence of dry weather also afforded favourable conditions for the grass-grub to continue its depredations on grass and lately sown crops, even on young crops of cereals, in the South Island.

Recent rains and the present mild weather have been timely, and give every promise of relief from the disheartening conditions previously obtaining. The condition of stock throughout the greater part of the South Island remains satisfactory in spite of the adverse conditions experienced during the season. Generally winter weather will be faced under far more favourable auspices than could have been anticipated a month or two back.

THE INDIVIDUAL COW.

No two things in nature are identically the same, whether they be plants or animals, and it therefore always pays to study the individual dairy cow. It is not feasible in all cases to do this—to provide the treatment necessary to secure the best results from every individual member of a herd—but with the high-type milker it is a payable proposition. An instance in point: One of the deep milkers of the Holstein herd at the Weraroa Experimental Farm was giving an unsatisfactory yield when first handled, though supplied with an abundance of succulent feed in the shape of green maize. Dry feeding was tried—bran mixed with chaff—and the result was magical. After two feeds of this ration the milk-flow increased by two gallons a day. After several days the dry feeding was dropped, when the cow's yield fell to its former level. The dry feeding had to be resumed. This, of course, is not a common case, but it emphasizes the necessity of studying the idiosyncrasies of the individual cow.

GRASSING HILL COUNTRY.

A WEST COAST (S.I.) EXPERIMENT.

THE Director of Fields and Experimental Farms reports that the following work is in progress in the Westland (South Island) District. This is country where agricultural pursuits have not made any great development, the interests in that district having been somewhat apart from agriculture.

The area selected by the Agricultural and Pastoral Association, Westland, for the experiment, is one of many gullies running through the terrace lands of the district, typical of thousands of acres, and is situated on the farm of Mr. Thomas Marks, and about half a mile distant from the Blue Spur Road, Hokitika. The gully had grown average-sized timber, and fairly dense scrub, which had been felled and burnt. The burn made a fairly clean sweep of the vegetation, but little of the timber was consumed. Both faces of the gully are covered with a peaty soil. The terrace lands adjoining on both sides of the gully are *pakihi* formation, and the flora similar to that described by the Chief Agricultural Chemist in the Annual Report of the Department, 1909, page 464.

The experiment consisted of seventeen plots, 4 ft. wide, stretching across the gully, on which a trial test of different seeds was sown, and two plots, each 21 ft. wide, also stretching across the gully, on which a mixture of grasses, &c., was sown.

The area was surface-sown on the 15th March, 1911, in plots as follows: Plot 1, cocksfoot; plot 2, crested dogstail; plot 3, meadow foxtail; plot 4, meadow fescue; plot 5, New Zealand tall fescue; plot 6, timothy; plot 7, fiorin; plot 8, rough-stalked meadow-grass; plot 9, wood meadow-grass; plot 10, smooth-stalked meadow-grass; plot 11, white clover; plot 12, alsyke; plot 13, lotus major; plot 14, burnet; plot 15, yarrow; plot 16, lucerne; plot 17, Rhodes grass.

Mixture of Grasses.—Plot 1: Cocksfoot, crested dogstail, meadow foxtail, meadow fescue, timothy, wood meadow-grass, smooth-stalked meadow-grass, rough-stalked meadow-grass, awnless brome-grass, white clover, alsyke, lotus major, burnet, lucerne, chicory.

Plot 2: Cocksfoot, meadow foxtail, timothy, white clover, lotus major, alsyke, burnet, lucerne, chicory.

A further area of 9 acres in the same gully is now being sown with another mixture of grasses.

SOIL REQUIREMENTS.

A METHOD OF DETERMINATION FOR THE FARMER.

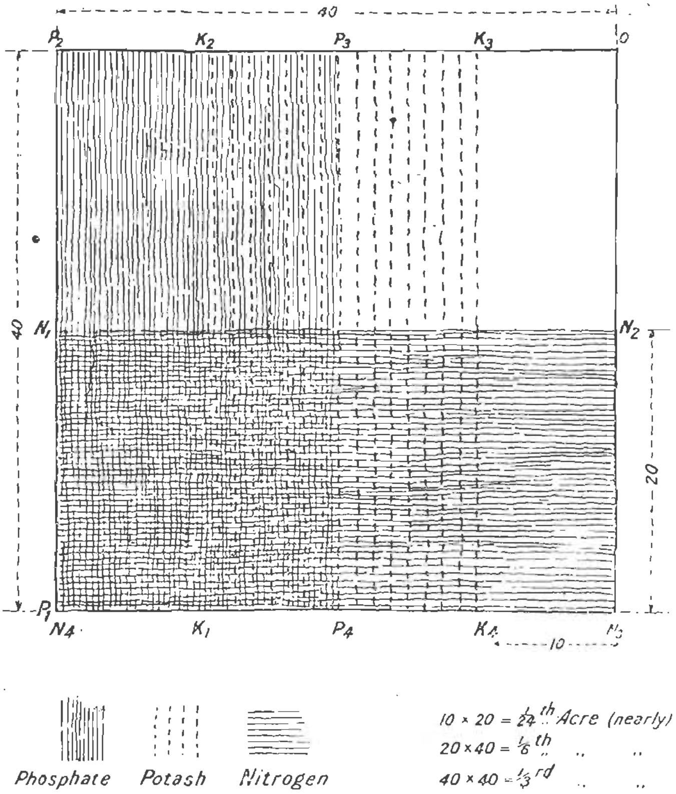
It is generally conceded that if the farmer is to have an exact knowledge of the plant-food constituents of his soil he can best obtain it by conducting an experiment to that end. It is not possible to test the characters of soils in a manner which will furnish data exact enough to constitute a guide for the farmer over any considerable area of country, especially in this Dominion with its variable earth-covering. Local knowledge is essential, and in the great majority of cases this can best be secured by the individual farmer, who, in the necessary search for a guide to effectual manurial treatment, is encouraged to more exact methods of work in general. The best scheme so far devised for the carrying-out of such individual experiments is that described by Mr. J. Alan Murray, B.Sc., in his work on "Soils and Manures," under the title of the "eight-plot test." Mr. Murray writes :—

"This plan of experiment is commonly known as the 'eight-plot test,' because that is the number of plots required to carry it out in its entirety. The plots may be of any size, and may be arranged in any order that is convenient. It is advisable, however, that they should not be too large. When the plots are small it is easier to compare the effects of the manures, a smaller area is involved, and correspondingly smaller quantities of the manures are required. The following arrangement is a compact one. and gives perhaps less trouble than any other in applying the manures ; the total area of land involved is approximately a third of an acre, and the quantities of manure required are 1 cwt. of superphosphate or basic slag, $\frac{1}{2}$ cwt. of kainit, and $\frac{1}{4}$ cwt. of nitrate of soda or sulphate of ammonia. The phosphatic manure (superphosphate or slag) is applied to a piece of land 40 yards long by 20 yards broad, and the kainit to a similar piece overlapping half the breadth (10 yards) of the first throughout the length. The nitrogenous manure (nitrate of soda or sulphate of ammonia) is applied as a cross-dressing to the lower half, and extended 10 yards beyond the margin of the manured piece. These instructions will be more readily followed by comparing them with the plan.

"The phosphate is applied to the piece P_1, P_2, P_3, P_4, shaded with vertical lines. The kainit is applied to the piece K_1, K_2, K_3, K_4, shaded with dots.

The middle portion, K_1, K_2, K_3, P_3, P_4, thus gets both phosphate and potash ; of the other two portions, one gets phosphate alone and the other gets kainit alone. The nitrogenous manure is applied to the piece N_1, N_2, N_3, N_4, shaded with horizontal lines.

"The result is altogether eight plots manured as follows : Upper half—P_2, K_2, phosphate alone ; K_2, P_3, phosphate and kainit (no nitrogen) ; P_3, K_3, kainit alone ; K_3, O, *no manure*. Lower half—P_1, K_1, phosphate



and nitrogen (no potash) ; K_1, P_1, phosphate, kainit, and nitrogen (complete manure) ; P_4, K_4, kainit and nitrogen (no phosphate) ; K_4, N_3, nitrogen alone.

"It will be seen that there are three plots which receive only one kind of manure—phosphates alone, potash alone, and nitrogen alone—and three from which these substances are respectively withheld, the other two being added. The former should be compared with the unmanured plot,

the latter with the complete manured plot. The special manurial requirements of the soil may thus be judged, both from the effects of adding a particular kind of manure and from the effects of withholding it.

"The results can best be ascertained by gathering the produce of each plot and weighing it, but if they are not to be recorded, simple inspection will generally be sufficient. If the effects of the manures are not apparent to the eye it may be either because the soil does not require manure at all or because it requires some other treatment as well.

"When the experiment is conducted on purely qualitative lines—*i.e.*, when the results are to be ascertained by simple inspection—it is not necessary that the measurements should be very exact. They might be dispensed with altogether but for the necessity of adjusting the quantities of the manures, at least approximately, to the area of land. In the arrangement described above, the plots are 10 yards by 20 yards, which is very nearly one twenty-fourth part of an acre, and the quantities of manures given are at the rate of 6 cwt. of phosphate, 3 cwt. of kainit, and 1½ cwt. of nitrate of soda per acre.

"If the results are to be recorded, the experiments must be quantitative, and should be carried out with the exactness of a scientific investigation. The scheme of 'joint experiments' published by the Board of Agriculture includes one for the determination of the manurial requirements of the soil. It does not differ in principle from that described above, but is drawn up with a view to accuracy rather than simplicity. The results will be of much greater value for purposes of comparison with those of other workers if the instructions given in the scheme of joint experiments are followed in detail.

"The eight-plot test generally affords a fairly reliable indication of the special manurial requirements of the soil, but it is by no means infallible. The results depend to some extent upon the crop to which the experiment is applied, and the requirements of the crop must therefore be taken into consideration in drawing inferences. Apart from this, the experiment sometimes fails to return any definite and satisfactory answer to the question. This may be due not to any fault in the test, but to the fact that, in certain circumstances, it is not applicable. It does not take into account certain other conditions which have a considerable influence on productiveness."

APPLE-GRADING.

IN reply to an inquiry by the Director of Orchards, Gardens, and Apiaries Division, Mr. John Osborne, jun., Horticultural Instructor for Tasmania, states that 40 per cent. of the apples exported from Tasmania are graded by machine, and that the proportion graded by hand is rapidly decreasing.

PHALARIS COMMUTATA.

INTERESTING COMMUNICATION.

To the Editor.

SIR.—Noticing an inquiry in your March number as to canary-grass (*Phalaris commutata*), especially as to its ability to stand grazing, I give you my experience for what it is worth. Last April I sowed a paddock of 8 acres with this seed only, sowing about 1½ lb. to one acre, and giving it a face dressing of manure to give it a good chance, about 2 cwt. per acre. I did not put any other seed with it, as I hoped to save the seed this past summer. The land was good strong land, a river-flat, but inclined to be wet. In August I fed the paddock down hard, as I was determined to give the grass a severe trial, to find if grazing would kill it. In September I shut the field up for seed, but was very much disappointed with results—in fact, was quite disgusted, and inclined to give the experiment up as no good. In the beginning of December, as hardly any seed-stalks were visible, gave up the idea of saving seed, and turned the cows in. Have eaten the paddock pretty hard all summer until the last two or three weeks. Now, to my surprise, I find the grass coming up wholesale, and growing very strongly. I may add that part of the paddock was continually flooded all last winter, but it now seems none the worse. I think this is sufficient proof that grazing will not hurt phalaris. As to the quantity of feed thrown I cannot yet speak.

I enclose a plant for your inspection, to make sure that I have the correct variety. I should like to have advice as to how to get the maximum of seed from the paddock—that is to say, when I should shut it up, when expect to harvest it, and whether it will pay me to keep the stock off all this year with a view of getting more seed.—Yours, &c.,

Auckland. D. T.

The Director of Fields and Experimental Farms replies :—

It is difficult to definitely state, without seeing the seed-stalk, if the sample you forward is that of the special variety, but there is little doubt it is so, as seed of no other variety has been voluntarily introduced. For the purpose of saving the seed shut the paddock up somewhat earlier than when the making of hay is the objective, late in winter. To secure the best results the field must not be heavily stocked, as this means poached land in wet weather. Lightly stocking with young cattle or sheep should, however, be beneficial, always remembering that the stocking must be judicious. Better to lightly stock than to leave entirely untouched, as this may mean the encouragement of other coarse grasses. The time of harvesting depends to same extent on the date of closing up the field, and more particularly on the nature of the season. Towards the end of December would be about the right time; in fact, on the experimental farm at Ruakura, where a considerable quantity of seed was saved, harvesting took place about that time. Any further particulars as to the behaviour of the grass under stock you may care to supply will be appreciated. A paddock could be divided, or a small portion fenced off, to test the effect of stocking against non-stocking. Your communication is most interesting, and should prove of great value in arriving at a solution of the problem of effectively grassing northern country. It is records of such work that the Department is seeking.

PERENNIALIZED ITALIAN RYE.

THERE have been frequently introduced into New Zealand, either by the Department or by individual farmers, seeds and plants for which many advantages have been claimed. Experiment with, or observation of, growing crops, however, results in failure to maintain their reputation. One of these is perennialized Italian ryegrass. A settler in a north-western district of the North Island secured some seed of this, and planted 4 acres. The seed was sown in October, 1909, and came away well, but did not stool out, running up thinly to seed, and producing nothing like an ordinary crop of Italian rye. This year it has become thinner and thinner, and is now so poor that the farmer in question intends ploughing the paddock, and resowing with other grasses.

The manager of the Moumahaki Experimental Farm, Mr. Primrose McConnell, reports,—

"In November, 1909, three small beds of Italian rye were sown in the grass-plot paddock. One was English seed, one New-Zealand-grown seed, and the other perennialized. Up to the present the last-named variety cannot be said to be in any way superior to the other two—in fact, after a long period of drought the perennialized has the worst appearance of the three varieties. Whether it will be more permanent as a pasture-grass remains to be seen. The above remarks also apply to a small patch that was sown in paddock No. 18."

NOXIOUS WEEDS.

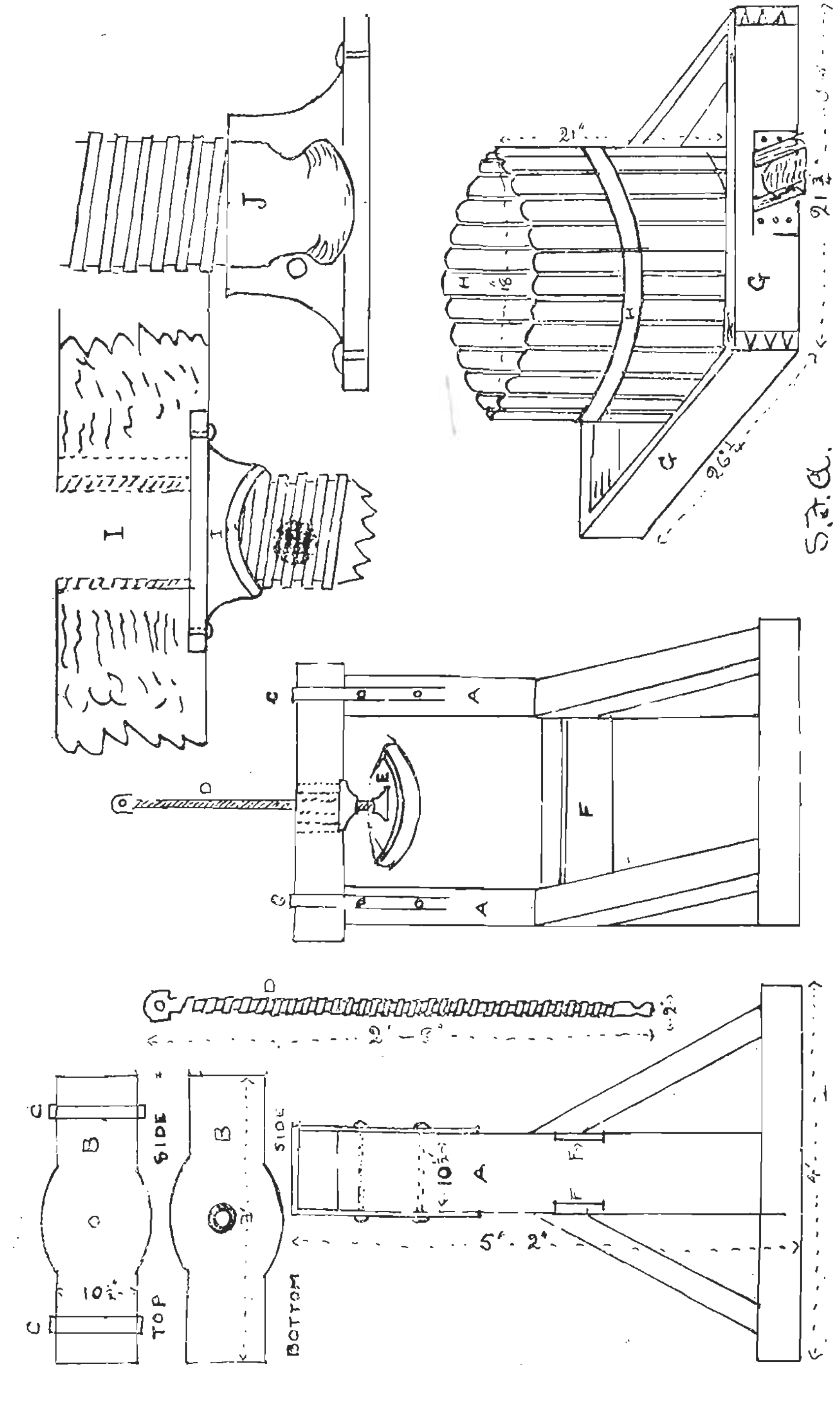
FARMERS in the Tarata district, Taranaki, have formed a vigilance committee in connection with noxious weeds. If the intention of such a committee is to support the local officer responsible for weed-eradication, its existence will be heartily welcomed. Extension of the principle would do much to bring about a more healthy conception on the part of settlers of their responsibility in weed-control. The Noxious-weeds Inspector can do little good in the absence of a healthy public opinion and loyal support of land-owners. The Tarata settlers are to be complimented on leading the way in this connection. They can be assured that the officers of the Department will render them every assistance, and they can be further assured that their action would be of the utmost benefit in a district, such as theirs, where weeds have not been permitted to obtain a foothold. It is in these districts that early action is of the utmost advantage. It should be pointed out, however, that coercive action can only be undertaken after due inspection by the Department's officers, who do not coerce except where other methods have failed, or after systematic endeavours at reform have not been responded to.

A WINE PRESS FOR THE SMALL GROWER.

As several inquiries have been received by the Orchards, Gardens, and Apiaries Division for information concerning the construction of a small wine-press, the following drawing and specifications have been prepared by Mr. S. F. Anderson, Vine and Wine Instructor, who also supplies the drawings which appear on the opposite page :—

SPECIFICATION.

The heights of side uprights, including the bed-pieces and screw-beam, is 5 ft. 2 in., and made of 10½ in. by 4 in. plank (A). The screw-beam (B) is made of 12 in. by 4¾ in., and 3 ft. long, reduced to 10½ in. with swell in the centre where screw passes through. This beam is fastened on top of the uprights by iron straps and bolts that go right through (C, C). The press-screw (D) is 2 ft. 8 in. long, with a diameter of 2 in., with strong head perforated to admit a ¾ in. bar for working ; the cut ⅛ in., and four threads to the inch. The tail to be formed as shown in sketch (J) for working in socket on press-head. It is kept in its place by the pin. The press-head (E) to be made of two pieces fastened together, the lower piece to be of 1½ in. stuff, and 17 in. in diameter, the upper of 2 in. stuff and 1 in. less in diameter, on which is firmly screwed the socket to take the tail of the screw. The uprights are strongly strutted on each side with 4¾ in. by 4¾ in. on each side to bed-pieces of same width as the uprights, each 4 ft. long, and to be tied together by pieces (F) of 5 in. by 2 in. let into the uprights on each side. These carry the tray of the cage ; they should be bolted on. The tray or table of press (G) is 26¼ in. by 21¼ in. The sides are 3 in. by ¾ in., dove tailed at the corners. The floor is of 1½ in. stuff, and the sides let into this and made watertight. This rests on the 5 in. by 2 in. pieces let into the uprights. The cage (H) is 21 in. deep and 18 in. in diameter inside, with 21 staves. The staves are about 2½ in. by ¾ in., and placed with openings ¼ in. on the outside and ⅛ in. on the inside. These are riveted on to the two hoops. The hoops are of 2½ in. by ¼ in. iron. The press-screw passes through the spiral groove (I) or female screw that is let into the beam with the flange recessed in the underneath side of beam, as shown in sketch. The press should be fixed permanently in a convenient place in a shed, and a small platform built for standing on to work it.


SIDE
TOP
SIDE
BOTTOM

HEMP-MILLING.

UNIFORMITY OF GRADING BEING ADVANCED.

W. H. FERRIS.

RECOGNIZING that uniformity in the work of grading is imperative, the Minister of Agriculture approved of a temporary transfer of the grading officers. This has already been effected. The graders, in consequence, are being afforded full opportunity to study the hemp being produced in different parts of the Dominion, and to compare their conception of the grades with that of their fellow-officers. Before the graders return to their own ports a conference will be held in Wellington in order to bring about a thoroughly uniform conception on the part of all the officers in regard to hemp quality—the features to be encouraged and the weaknesses to be checked. The graders will also be afforded an opportunity of visiting the most up-to-date mills in the Wellington Province, so that they may become acquainted with the several developments in milling-machinery which have taken place during the past few years. It is expected by this means to circulate in the various hemp-milling districts sound ideas in regard to the best and most economical methods of hemp-production.

During the month of April a considerable decline in production of hemp, especially in the Manawatu district, took place, owing principally to overtime work being relinquished (due to the winter weather interfering with the bleaching process), and, in a smaller degree, to temporary cessation of work owing to the Easter holidays.

While the improved strippers have eliminated one of the chief drawbacks to the preparation of phormium hemp in the past—the bruising and breaking of the fibre—there is a tendency under the new method to go to the other extreme, and produce a fibre of too coarse and wiry a character. Not only is the body of the fibre too strong, but it is very difficult, owing to the improper elimination of the vegetable matter, to secure a good colour under the circumstances. There are quite enough coarse fibres on foreign markets, and manufacturers look to the better grades of New Zealand hemp to give them a soft free thread. The new strippers have worked a revolution, owing to their having obviated the rigidity which caused the bruising of the fibre, but care must be taken that too much play is not allowed, so

that while fibre is secured free of bruise it may be thoroughly stripped. It is gratifying to know that experiments are still being conducted with the object of further improving the process.

In regard to the work of the past month the weaknesses complained of in the April issue of the *Journal* are still manifest, especially the failure to properly scutch the tails, which is a general defect. This is particularly noticeable where millers do not clip the tails of the hanks before the scutching process.

ARGENTINE TRADE WITH BRITAIN.

THE Commerce and Tourists Division of the Department of Agriculture, Commerce, and Tourists has received the following cablegram from Buenos Aires, dated 6th May, 1911 :—

The following shipments of produce were despatched from the Argentine to the United Kingdom ports during April, 1911 (compared with April, 1910) :—

	1911.	1910.
Frozen beef (quarters)	147,153	92,395
Chilled beef (quarters)	160,037	112,812
Frozen mutton (carcases)	178,753	228,431
Frozen lamb (carcases)	61,208	83,787
Butter (cwt.)	Nil	14,589

AGRICULTURAL-SHOW DATES.

THE WINTER FIXTURES.

Auckland Winter Show, May 22–27, Auckland.
Waikato Winter Show, June 6–10, Hamilton.
Taranaki Winter Show, June 7–10, New Plymouth.
Southland Winter Show, June 7 and 8, Invercargill.
National Dairy Show, June 20–23, Palmerston North.
Dominion Dairy Show, July 5–8, Hawera.
Otago Winter Show, August 15–19, Dunedin.

Secretaries of rural show societies in general are requested to forward the dates of the shows of their organizations as soon as available, for notification in this *Journal*.

Gregor Mendel, the Austrian monk whose great research-work in plant-breeding was for many years overlooked, has been fittingly honoured by the erection of a monument to his memory at his birthplace. The unveiling ceremony was recently performed in the presence of a large gathering of scientists of all nationalities.

THE FARM GARDEN.

CULTIVATION OF CABBAGES.

W. H. TAYLOR.

Two sowings of seed will provide plants that will maintain a supply throughout the year. I am aware that at least one more sowing is usually made: it is not necessary. The time for one sowing is at the end of autumn, from the last week in March to the first week in April. Some slight difference in time is advisable in various climates and situations, of both of which there are many in New Zealand. One point is, however, unalterable—viz., seed must be put in either in late autumn or early winter in order to secure plants for putting out in spring. This is the great stumbling-block to many people, who cannot understand the necessity for sowing so far in advance of planting-time. It is not safe to sow earlier than the end of March, because earlier plants would in all likelihood bolt to seed without hearting; in any case they would grow to an unwieldly size before winter comes to check them. To secure the best of plants it is advisable, as soon as the young plants can be handled, to prick them off into a nurse-bed, placing them 5 in. or 6 in. asunder. Here they will make dwarf and well-foliaged plants. If this is not done the plants should be thinned, so that they may not crowd each other in the seed-bed. This is not a matter of any importance in summer-time, but is of vital importance with plants that have to remain in the bed during the short, damp, winter days.

The time to plant will depend on the state of the soil. Never plant till there is a surety of growth following at once. The time to plant extends from mid-June to early August; the former time for well drained soil, the latter for damp situations. The plants will begin to heart early in November, and continue good till the end of January. Such a crop is particularly valuable, because the stems will produce a crop of sprouts, which frequently exceed in value the first crop or ordinary heads. The sprouts resemble miniature cabbages, solid hearts, frequently weighing three or four pounds each, and even more when they are restricted to about three to each stump, as they should be. When the original head is cut, it is well to make two crosscuts across the top of the stump, cutting right across, and about half an inch deep. This allows the stump to spread, and also induces the formation of sprouts. These usually appear in considerable numbers. Reduce them to at most four. The sprouts will maintain a

supply till winter cabbages come in. Most people who have used them prefer hearted sprouts to the first heads, because they are much milder in flavour.

The other sowing mentioned as being necessary should be made during the third week in November. The plants will be ready to put out during the period embraced in the last week in December and the first week in January. The crop will begin to be useful by the end of March, and will continue all winter. The stumps of these are as well removed when the head is cut. Sprouts from them are useless, as they bolt to seed in spring before attaining to a useful size. There is so little difference in the value of different varieties that it is as well to leave the selection of garden cabbages to be made from the catalogues. With

FIELD CABBAGES

it is different. The Drumhead type must be chosen, because they only give the necessary weight. The farmer usually grows one crop only—a winter crop. To secure it sow about the 25th November, and plant out by the middle of January, as much earlier as the development of the plants will admit, but not later.

THE WAY TO PLANT.

Sometimes planting is done by the plough. The plan has much against it. If the soil is at all lumpy the plants are likely to be injured, and some buried. If the soil is light it lays too lightly on the roots, and they dry up. It also leaves the soil in a rough state, open to the drying influences of wind and sun, and encouraging the growth of weeds. The soil should be cultivated into a clean condition, and planting done by means of a short-handled hoe, such as is used in some districts to plant potatoes. The hoe has a handle about 15 in. long, so that it can be used with one hand. The hoe is driven into the ground with a smart blow, and with the same movement brought slightly towards the planter. This leaves a space behind the hoe for the roots of the plant. The hoe is then withdrawn, the soil falls in against the roots, and a push with the head of the hoe firms it down. By this method none of the dry surface soil reaches the roots, which consequently do not suffer, and the plants will hold their own till rain comes, even if that be long delayed. Before planting, lines are marked out with a drag marker, or a furrow of a cultivator is followed. A good distance apart is 33 in. between the rows, the planter inserting a plant for every step he takes. A lively man can by this method plant from two thousand to three thousand plants in a day of eight hours, according to the nature of the soil.

The plants must be kept free from weeds by hoeing and cultivating until they are making strong growth ; then mould up with a plough.

Manuring.

Soil deficient in humus will not grow good cabbages. Experiments have conclusively proved that green manuring, supplemented with fertilizers, is as efficient as, and perhaps more so than, stable manure. Peas or clover are best to plough in, being legumes which gather nitrogen from the atmosphere. Tares are valuable, and will produce a crop late in the season when it would be too cold for peas or clover to grow. Air-slaked lime, 1,200 lb. per acre, applied after ploughing the green crop under, and before planting, has increased crops enormously. Basic slag is profitable at the rate of 3 cwt. or 4 cwt. per acre.

PECULIAR HOME OF BUMBLE-BEES.

A short time ago, and while on my last visit to Canterbury, I accidentally discovered (reports Mr. F. A. Jacobsen, Apiary Instructor) a colony of bumble-bees in a very peculiar position. I was walking about in an apiary a little distance from Christchurch when I happened to glance up into the surrounding willow-trees, and, to my astonishment, saw a number of bumble-bees flying round a deserted sparrow's nest. I immediately got a ladder and commenced climbing the tree to find the cause of the activity, and was rather surprised to find that a pair of old bees had made their home in the interior of the nest. I pulled the nest down, and, having hung it on the barbed-wire fence just below its previous position, watched the young yellow-marked bees come sporting about. They were two or three dozen in number, and were very handsome. They apparently took the shifting of their home as of no material consequence, for I never saw one bee go back to its high place of old. I did not break the nest to find what it contained, but could see a couple of round balls of honey near the entrance. A friend took it to his home two days later as a curiosity. Bumble-bees as a rule build their nests in a hole in some bank or in the ground, but the above case was an interesting exception.

WAKEMAN'S FESCUE.

This very interesting grass, used extensively in Britain for bowling-greens, &c., and said to thrive under the most rigorous conditions, and which was imported by Mr. W. Wakeman, of Pahiatua, is to be tested by the Department this year at the Ruakura and Tauranga Experimental Farms. The seed, by the way, is not known to commerce, and, therefore, has not been under cultivation. Mr. Wakeman, however, has been successful in saving seed, and all he has secured this season he has handed to the Department for experimental purposes.

The Agricultural Experimental Station at Rothamsted, England, is the oldest in the world, being established in 1843, though the plant has records of field-production that reach back about seventy-six years.

WEATHER AND AGRICULTURE.

D. C. BATES.

RAINFALL FOR APRIL, 1911.

Departure from Normal for the Month, + above, − below.	Station.	Total Fall.	Number of Days Rain fell.	Maximum Fall, and Date.
	North Island.			
In.		In.		In.
+ 4·76	Pakaraka	8·10	17	2·90 on 2nd.
+ 6·09	Auckland	9·43	21	2·17 „ 20th.
+ 2·53	Waiuku	6·76	17	2·44 „ 20th.
+ 9·09	Waihi	14·82	24	4·24 „ 3rd.
+ 2·11	Hamilton	5·70	17	1·54 „ 20th.
+ 2·71	Gisborne	7·52	16	2·52 „ 16th.
+ 1·60	Greenmeadows (Napier) ..	4·90	16	1·86 „ 20th.
+ 3·49	New Plymouth	7·72	22	2·48 „ 14th.
+ 0·69	Inglewood (Taranaki) ..	9·10	21	1·72 „ 14th.
+ 0·59	Wanganui .. .	4·47	13	1·15 „ 28th.
+ 0·48	Levin	4·40	16	1·76 „ 27th.
− 1·51	Wellington	2·53	18	0·62 „ 26th.
	South Island.			
+ 0·86	Nelson	3·77	13	1·05 on 26th.
− 1·40	Highfield (Amuri) ..	1·58	7	0·70 „ 20th.
− 0·77	Hokitika	7·94	15	2·62 „ 26th.
+ 1·26	Okuru	16·24	15	4·70 „ 22nd.
− 1·23	Lincoln	0·82	11	0·24 „ 20th.
+ 0·75	Kapunatiki	2·60	12	0·56 „ 21st.
+ 0·01	Oamaru	1·90	7	0·72 „ 21st.
− 0·74	Balclutha	1·12	6	0·46 „ 23rd.
− 0·79	Dipton	2·12	8	0·86 „ 22nd.
− 1·48	Invercargill	3·03	19	0·64 „ 22nd.

SUMMARY FOR APRIL.

THE month of April was subject to frequent changes in atmospheric conditions. Extensive low-pressure areas from lower latitudes three times overspread the northern districts, bringing heavy rains in many parts of the North Island. No less than five low-pressure areas from the westward passed southward of New Plymouth and Castlepoint, with the usual shifts of wind from north by west to south, changing from warm and humid

conditions to cold and showery weather. Two anticyclonic systems passed —one between the 7th and 14th in the North, and another in the South between the 15th and 21st. The close of the month was remarkable for strong westerly and southerly winds in advance of high pressure which prevailed everywhere on the evening of the 30th, and gave the first touch of the approaching winter to many parts of the country.

A result of the dry summer and the warmth of the soil was the remarkable abundance of mushrooms which followed each autumnal rain in many parts of the country. These conditions were also favourable to a growth of grass, which removed considerable fear of a shortage of winter feed.

The rainfall was above the average over most parts of the North Island, and especially northward of New Plymouth and Napier. There were also more than the usual number of rainy days. This applies also to the South Island, where the frequent changes brought passing showers, and though on the west coast the rainfall was above the normal for the month, the general result on the east coast was slightly below the mean. Cloudy and foggy weather was much in evidence, but, on the other hand, owing to the prevailing winds being from the warmer northern regions, the temperature was considerably above the average for this season of the year.

NORTH ISLAND.

Whangarei Heads.—For the farmers April was a good month, warm rain falling on thirteen days. A thunderstorm occurred on the 28th ; the lightning was very bright. —(*F. J. McKenzie.*)

Auckland.—An unusually wet and warm April, the total rainfall being more than twice the average for the past forty-four years, and the mean temperature being 4° above the average. The growth of the grass in pastures, &c., has been almost phenomenally rapid.—(*T. F. Cheeseman.*)

Karaka, Drury.—A somewhat rainy month. Comparatively high temperature throughout, the maximum in shade out-of-doors exceeding 73°.—(*H. E. Glasson.*)

Waihi.—Abnormally wet ; mean temperature considerably above average of previous years. These factors are responsible for the great growth of vegetation this month. It is interesting to note that the handsome native flowering-shrub *Pomaderris elliptica* is in flower-bud for the second time—a token of the mildness of the month. Torrential rain fell on the 20th, with the passage of a low pressure from lower latitudes. Nearly 3 in. fell in three hours, serious washouts resulting. Two severe thunderstorms occurred ; fogs were frequent, whilst strong winds were recorded on several occasions. In short, the cyclonic unit again held sway after an absence of some months. The mean soil-temperature at 2 ft. was 62·5°—a decline of 2° from the previous month.—(*H. B. Devereux.*)

Athenree, Tauranga.—The rainfall has been heavier than usual in this district for the month of April, the total amounting to 11·60 in. For the most part the weather has been dull and cloudy, even on the days when no rain has fallen.—(*Rev. W. Salter.*)

Waerenga.—The weather here this last month has been all that could be desired. Rain has fallen, and farmers have been able to get in their grass-seed under almost ideal conditions. Grass is also making good headway owing to the absence of frosts, and if we can only have two or three more weeks without a frost, feed will not be so scarce as was anticipated at one time during the past dry summer. On 26th April we had a tropical downpour accompanied by a heavy gale: 1 in. of rain fell in eighty minutes.—(*G. Mills.*)

New Plymouth.—A very wet month, with some very warm and some very cold days. Prevailing winds were south-east and east.—(*W. D. Fletcher.*)

Taihape.—Showers of rain began to fall on the 3rd of the month and continued at intervals until the 20th, since which date showers have fallen daily. As the weather has been warm for the time of the year, and there was not enough rain to cool the ground too much, a good gowth of grass, &c., has resulted. No frosts have been recorded here as yet this autumn, although there have been one or two light frosts on low-lying ground.—(*A. R. Fannin.*)

Pahautanui.—The past month has been typical autumn. The dry weather which has prevailed for the past seven weeks practically broke up about the middle of the month, with colder nights and frequent light rains, and some thunder and lightning which was very harmless. Grass and crops are much improved by the rains, and the country is clothed in beautiful green where before was dull brown; but the colder atmosphere with the light frosts will soon put a check on these bright conditions, and the gloomy aspects of winter will be with us.—(*J. Pearce.*)

Gwavas, Tikokino.—We have had a most remarkably warm autumn here, and the late rains have caused the roses and many other flowering-shrubs to bloom profusely. We have not experienced any frosts yet, but once or twice during the past week the temperature has just touched freezing-point.—(*H. Irwin.*)

Tutira Lake.—A very high average: minimum temperature in Stevenson screen, 54·3°. Jordan sunshine-recorder showed five sunless days and six cloudless days.—(*H. Guthrie Smith.*)

Annedale, Te Nui.—The rainfall during the latter part of the month was badly wanted, and all of it went into the ground; with warm nights it has made a great improvement in the grass, and if rough weather does not come early there ought to be plenty of feed for the winter. Sheep and cattle are doing well. There has been some rust on the grass; it seems now to have disappeared.—(*H. A. Nevins.*)

Dilton, Masterton.—Good warm growing weather; no frosts.—(*S. Mawley.*)

SOUTH ISLAND.

Robin Hood Bay.—A very variable month; very wet and almost frosty at nights. The minimum temperature varied from 60° on the 7th to 42° on the 30th; the maximum from 77° on the 1st to 56° on the 24th.—(*Henry J. Stace.*)

Lynton Downs, Kaikoura.—The first half of April had weather of such a character that suited the Kaikoura County excellently, being fine and warm. The latter half of the month was sufficiently wet to insure abundance of grass, which never really stops growing during the winter. This county appears to be about the only district on the east coast of the South Island unaffected by the dry weather.—(*T. Harrison.*)

Hanmer Springs.—Weather on the whole mild. Autumn crops well above ground. Fairly good feed.—(*J. Campbell Duncan.*)

Christchurch.—Rainfall for the month was about the average for the month, but mostly fell on the 18th and succeeding days, being welcome to the farming community.—(*Henry F. Skey.*)

Pleasant Point.—Drought broken up at last, although too late to give us much feed for the winter. The ground, however, is well soaked for several inches down, and ploughing, &c., can readily be done, and winter wheat sown.—(*J. Bishop.*)

Waimate.—The rainfall at the end of last month and beginning of this was a welcome relief to the long-continued drought. About the middle of the month conditions were somewhat drier than at the beginning, but very good rains from east and north-east occurred in the latter part of the month, and the ground is now in excellent condition for working and for growth. A very fair growth of grass considering the time of the year has resulted, and has put a different appearance on the face of the country generally.—(*W. M. Hamilton.*)

Bushey Park, Palmerston South.—Owing to the recent fine rains and the absence of frost, the face of the country is entirely changed. The pastures are as green as in spring, and the autumn-sown crops are making good progress. Very heavy rain fell on the 28th, 1·64" being registered in three hours and a half.

Gore.—Rain came just in time to save the turnip crops and pasture. Winter feed is now looking well, and there has been an absence of frost so far.—(*A. A. Scott.*)

Lower Crawford's.—More rain has fallen in the month of April than in any one month for a considerable time past. Grass is gowing well, which makes the outlook for winter feed much brighter than was the case a month ago. We have had a few slight frosts, but as there is little or no snow on the high country there is no likelihood of it becoming severe enough to check growth. At present the sky is clear and settled. The rain having been general throughout the district, the Manuherikia River is at a higher level than for the past eighteen months.—(*J. C. Buchanan.*)

Galloway, Alexandra South.—The weather has been exceedingly mild this month; no snow as yet showing on the surrounding hills. The nice warm rains we have been having have greatly improved the appearance of the district, the grass is coming away well.—(*A. Gunn.*)

Riverton.—April saw the break-up of the long spell of fine weather, and the heavy fall on the 10th and 11th was very welcome. No frost has yet set in, and grass is plentiful.—(*J. Geary.*)

A NOTABLE INVESTIGATION.

THE work of a scientist which may have a far-reaching effect on potato-cultivation is that of Dr. Salaman, a European investigator, who is studying the potato from a Mendelian standpoint. He has recently announced that susceptibility and immunity to disease are probably Mendelian "factors," and may yield to the treatment which, in the hands of Professor Biffen, of Cambridge University, has been so successful in producing a rust-proof oat. It is unnecessary to point out that should Dr. Salaman's hypothesis be correct his discovery will revolutionize the work of potato-growing.

POULTRY-KEEPING.

F. C. BROWN.

DUCK-RAISING.

THE three most popular breeds of ducks in New Zealand are the Pekin, Aylesbury, and Indian Runner. The two former are somewhat different from the latter, being mainly bred for table purposes, whilst the latter is not only a medium table bird when properly fed and marketed, but it is the greatest egg-producing machine of all species of bird-life for two seasons or more. There are many people in New Zealand who might add a few shillings per week to their incomes by keeping a few head of Indian Runners, managed on proper lines. As regards the initial cost, keeping a few head of ducks has advantages compared with poultry. In the greater part of New Zealand they do not require houses—good shade and shelter are all that is necessary; the cost of erecting runs is much less; the ducks are easy to rear, and will do well on a much cheaper food than is required by poultry. Ducklings are very subject to sunstroke, causing great mortality, consequently shade is necessary.

HOW MANY DUCKS TO ONE DRAKE.

With Indian Runners one drake to six ducks, and for the heavier breeds, such as Aylesbury and Pekin, one drake to four ducks are the proportions for breeding purposes. During the summer or natural laying season the number of ducks may be considerably increased. Of course, much depends on the vigour and health of the males. When the drakes commence fighting it indicates that more ducks are required in the breeding-pen, or the number of drakes lessened.

HOW TO TELL A DUCK FROM A DRAKE.

The drakes mostly have a curled feather in the tail. When this is not developed the voice is the best guide. The duck calls "Quack, quack!" and the drake in a strong deep voice says "Quite right!"

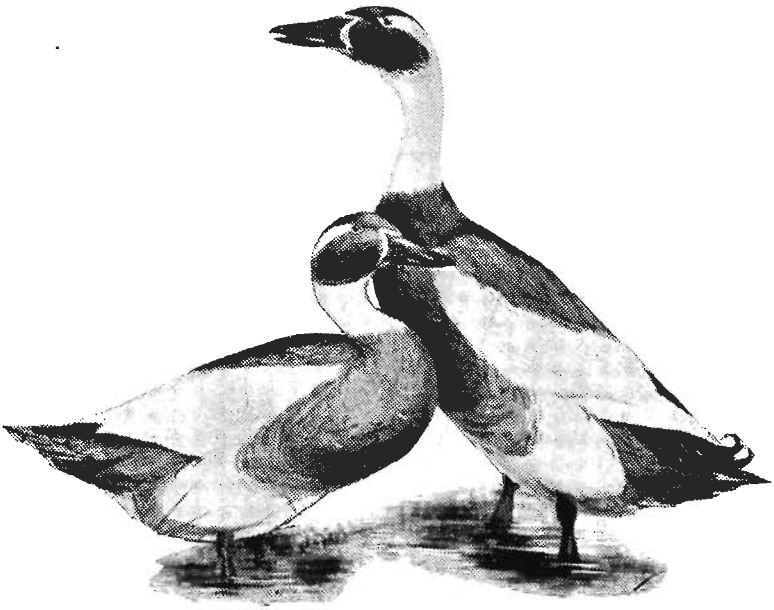
BROODING DUCKLINGS.

The temperature of the brooder should be 90° to 95° before the ducklings are placed therein, and should be gradually reduced as the birds grow older. Ducklings are much easier to rear than chickens in brooders; they, however, require ample fresh air, which is the key-note in successful rearing. The brooders should be so constructed that the desired temperature can be maintained without excluding the fresh air. Ducklings have not the same natural instinct as chicks, and will not move away from the main volume of heat when this is excessive. It frequently occurs that the higher the temperature the more will the

ducklings huddle. For this reason the front of the brooder-box should be left open, a curtain in front being all that is necessary. Should ducklings be found huddling outside of the brooder by all means put them back in the heating-chamber. Ducklings do not require artificial heat so long as chicks, and if reduced by degrees it can generally be cut off altogether when they are about three weeks old. Of course, much depends on the weather-conditions.

FEEDING DUCKLINGS.

Ducklings should not be fed for thirty-six hours after hatching. During the first few days feed equal parts of scalded bran and pollard. mixed with a small quantity of oatmeal, and with 5 per cent. of coarse sand added: this being fed four times a day, all that the ducklings



THE INDIAN RUNNER.

will pick up. After the birds are a week old do not mix grit with their food, but keep it within easy reach of them, so that they can help themselves. Finely cut green food should be fed separately after the first week. Give 5 per cent. of minced meat after the first ten days, and increase this up to 10 per cent. as the ducklings grow older. As they develop feed equal parts of maize-meal, pollard, and bran, given three times a day, and maintain this ration till they are ready to kill. The mash can be mixed with cold water after the birds are two weeks old. Avoid giving green food and meat a few days before killing, then the carcase will keep longer. Ducklings should be fed from troughs. If the food is thrown on the ground a large part of it will be wasted.

Ducklings intended for market should be made to gain weight from the shell to maturity: the least check means a set-back and a reduc-

tion of profits. When fattening, ducklings do not require water to swim in. If they do not have water they do not fret for it. Only supply liquid at feeding-time. If water is always before them they simply pump the food through them, and do not get the good of it. The drinking-vessels should be deep, so that the ducklings can give their nostrils a good blow out; if the nostrils are allowed to clog the eyes become plastered, and disease soon sets in.

Ducklings should not be allowed to gorge themselves first thing in the morning. It is well to give a good feed and drink last thing at night, and feed sparingly in the morning.

Ducks should be marketed before the second feathers begin to grow, otherwise the greater portion of the food will go to produce feathers, and the formation of flesh will be retarded; besides, when the second feathers have formed the birds are difficult to pluck.

The first-year duck, well matured, is the best for early eggs and fertility. To obtain early eggs keep the birds in sheds bedded with straw or litter. Owing to ducks dropping their eggs anywhere, they should be yarded away from the pond at night. Good fertility can be obtained from Indian Runners when they are kept away from water, but for the heavier breeds better results are obtained if water is provided.

Ducklings without a supply of animal food in some form and vegetable-matter do not make a rapid growth. Cut green bone may be fed sparingly after they are three weeks old. Ducks, like fowls, should be their own balancers. When gree nfood is mixed in the mash, and is left in the trough and the ground grains eaten, reduce the proportion of vegetable: it is a sure sign the birds are getting too much.

FEEDING DUCKS.

For breeding-birds, feed three parts of bran, one of pollard, one of maize-meal, and 5 per cent. of boiled meat, with boiled green food added. This ration is suitable for laying ducks, but the quantity of meat must be considerably increased when high egg records are looked for. Either from ducks or fowls the changing suddenly of any method of feeding will check egg-production, and force the early pullet or duck into a moult.

TURKEY-RAISING.

Turkeys thrive best when given a free range, where they can pick up the greater part of their living, and select their own nests in secluded places. Turkeys will bear confinement less than any other of our domestic fowls. When the birds have reached a maturity stage, however, they may, if of a hardy strain, be kept in a limited space. Young stock are very tender up to the age of four weeks, and again at the time they begin to show the red head; here natural conditions are the only safe guide.

Turkeys do not require houses to sleep in: low roosts outside are all that are necessary either for old or young birds: the less coddling the better. When the young are hatched, allow them to roam at will, when they will pick up the natural food in insect-life, green stuff, and grit. After the birds are thirty-six hours hatched give them stale bread soaked in milk and squeezed dry, occasionally giving them rice that has

been boiled in milk. Oatmeal, broken wheat, barley-meal, and maize-meal may also be given. The food must be mixed to a dry consistency. Do not force the young chicks to eat; the old hen knows best, and will teach them at the right time. Feed sparingly for the first few days, but feed often; a feed every three hours is a good rule. After the chicks are four weeks old feed three times a day with broken grains. At this stage they mostly begin to wander, and sometimes only come home for the morning and evening meals.

Turkeys do not reach maturity until they are three years old; therefore it is a mistake to breed from birds under two years of age. A frequent change of blood is essential. The hens lay from twenty to thirty eggs, and then become broody.

Bronze Turkeys.

The most desirable breed is the American Bronzewing, which gives a large carcase, and is the hardiest of all breeds. Even with the Bronzewing, however, a frequent change of blood is essential. Standard weights of Bronzewings: Adult cock, 36 lb.; yearling cock, 33 lb.; cockerel, 25 lb.; hen, 20 lb.; pullet, 16 lb.

RAISING GEESE.

The breeding of geese can be carried on profitably, as they feed mainly on pasture. It is, however, advisable to give the old birds a little soaked grain at night in order to induce them to come home.

There are a number of varieties of geese, but the most desirable to keep are the Toulouse and the Emden. The Emden, being a pure-white colour, presents a much more attractive appearance when dressed for the table than the dark-plumaged birds, owing to the objectionable dark pin-feathers in the latter.

The average number of eggs laid is about thirty a year. Two or three geese should be kept with one gander. The best time to mate them is in their second year, and they should be dispensed with when they are ten years old.

It is better to use large hens, not geese, to incubate the eggs, giving each hen from four to six eggs. The length of time required to hatch is twenty-nine to thirty days. Sprinkle the eggs occasionally with warm water. When the birds are hatched, feed them in the morning as already described for ducklings. Keep the young birds away from the pond or stream until they are nearly feathered, but always have clean water before them to drink.

POULTRY-DISEASES.

It is not intended here to deal with every known disease to which birds are liable, as there are so many diseases that display practically the same symptoms; and very often the cheapest treatment in the end is the use of the axe. Prevention is the only effective means of fighting disease in poultry; and the breeder who keeps the houses clean, dry, properly ventilated without drafts, free from vermin, and who gives the birds an ample supply of grain, meat, and green foods, and also clean water, gravel, grit, and crushed oyster-shells need have little fear of disease.

Outbreaks of disease can mostly be traced to neglect of one or more of the above conditions, or to infection being carried with birds from an affected yard. When disease is noticed the cause should be looked for, and the affected birds should be at once isolated and put into well-sheltered quarters, and, if possible, an affected bird sent to the Director of the Live-stock and Meat Division, Department of Agriculture, Wellington, accompanied by a letter describing the condition of the flock and the method of feeding, &c. The appearance of any infectious disease should at once be reported.

Keep Fowls out of the Rain.

On showery and wet days the birds, if not shut in, are apt to wait outside for their evening meal, and go to roost with damp plumage. Egg-production is thus reduced, and the birds become affected with colds and running at the nostrils, a frequent forerunner of roup. During bad weather the fowls should be confined in the house by night, and given the morning meal inside. Should they be let out during the day, the evening meal should be given much earlier than the usual time, so as to avoid keeping the birds waiting in the wet.

Vermin.

While not, strictly speaking, to be classed as diseases, vermin are the greatest pests of poultry. There are many kinds of insect vermin, but the three to be most guarded against are body-lice, fleas, and red-mites. The worst of all are the last-named. They hide in the cracks and crevices by day, and torment the fowls at night, sucking the blood of the birds and causing great mortality. When charged with the blood of the fowls they have a deep-red appearance. The principal causes are unclean and overcrowded houses, or too many birds being kept under one roof, insufficient sun-rays, and want of proper ventilation. The red-mites make their first appearance under the ends of the perches, and can be prevented from spreading by suspending the perches by wires, so that the ends do not touch the walls of the house. The ends of the perches should be dipped frequently in some strong disinfectant. The house should have a periodical spraying of one part carbolic sheep-dip to a hundred parts water.

Dust-baths, which are nature's remedy, should be provided to enable the birds to rid themselves of the body-lice. They are not so harmful as the others, but they must be got rid of.

The fleas mostly make their appearance in the nest-boxes, and they also feed upon the blood of the fowl. If the nests are kept clean and well disinfected they will seldom be found. A good plan to prevent fleas appearing is to place in each nest a camphor-ball: these can be bought for a few shillings a gross.

To kill head-lice on young chicks, apply very lightly to the top of the head equal parts of flour of sulphur and lard; also, frequently dust the mother hen with equal parts of carbolic powder and flour of sulphur. Care must be taken that this reaches the skin. When in artificial rearing the chicks become infested with head-lice the trouble is mostly due to filthy conditions. Cleanliness is imperative, and occasional application of disinfectants is most desirable.

ROUP.

This is the most dreaded trouble that the poultry-keeper has to guard against, as, if it once gets a start, the whole flock may soon become affected with it. When fowls are observed to show any of the symptoms indicated, put half a teaspoonful of Condy's crystals into a pint bottle of water, add one dessertspoonful of the mixture to two quarts of the drinking-water three times a week, and on such days give no other water to drink. Should this fail, inject with a syringe, into the nostrils and mouth, equal parts of peroxide of hydrogen and water. Its symptoms are sneezing, eyes watering, nostrils closed, breathing deep, offensive breath, swelling round the eyes, and finally a cheese-like substance protruding from one eye.

LIVER-DISEASE.

This is an ailment frequently found in two-year-old hens. It usually makes its appearance in the autumn on the approach of the moulting. The birds mope about and become thin and pinched; the comb shrivelled and of a purple colour. The excretum is a light yellow, tinged with green. On opening affected birds the liver is mostly found to be of abnormal size; and, owing to inability to free themselves from the irritation caused, they often limp in their walk. The disease is mainly due to improper feeding, and the want of green food and grit. When green food, of which watercress is the best of all, is not obtainable, a periodical dose of Epsom salts should be given in the driking-water, allowing one packet to sixteen fowls. A piece of sulphate of iron about the size of a hazelnut added twice a week to about two quarts of the drinking-water is helpful. The birds affected should be removed to fresh quarters, and in severe cases killed and burnt. Immediately the trouble makes its appearance the whole of the house should be well disinfected with sheep-dip or other strong disinfectant. The front of the houses should be opened up to the sun—the greatest germ-killer of all. This liver-disease should be carefully guarded against; it is contageous, and is often a forerunner of tuberculosis.

PIP.

So-called from its chief symptoms—the bird calling out frequently as if she were saying "pip." This arises always from an unhealthy state of the internal parts, which causes a dryness of the membrane of the mouth, particularly the covering of the tongue, the end of which becomes horny. Many people remove this substance, which is a cruel practice, and only cures the symptom, not the trouble. Give ample green food, and twice a week a dose of Epsom salts in the water, when mixing the mash, allowing an ounce for every sixteen fowls.

CROP-BOUND.

The condition known as "crop-bound" is caused by irregular feeding. A hungry bird stuffs its crop to such a degree that the whole contents when moistened become a packed mass. Sometimes the want of proper green food is the cause: the birds pick up dry substances that will not leave the crop. The trouble can sometimes be overcome by opening the mouth and filling the crop with warm water, so distending the crop, which should then be worked about with the hand to soften the mass. This process may be repeated. Fast the bird for

twenty-four hours, and in a few days it will probably be all right. If this does not effect a cure, and the bird is worth the trouble, the crop may be opened with a sharp knife. The outer skin should first be cut and then drawn downwards, and an incision made into the crop itself large enough to insert the finger and draw the fibrous substance away. The crop should then be stitched separately with silk, and the outer skin afterwards. Feed sparingly on soft food for a few days, no water being given. Unless the bird is a valuable one it is not worth going to this trouble, as the ailment is likely to recur.

LIGHT-COLOURED YOLKS.

This is sometimes caused by feeding mangolds, or by the overfeeding of animal food, and forced egg-production; but, still, birds that have had no animal-matter and are only laying a medium number of eggs are sometimes affected. There is nothing better for producing the rich colour of yolk than the feeding of boiled meat in moderation; also supplying ample watercress, clover, lucerne, &c., when an improvement will soon be noticeable. A piece of sulphate of iron—say, the size of a hazelnut—in a quart of drinking-water twice a week will also assist.

BLOOD SPOTS IN EGGS.

Blood spots or clots in eggs are generally due to the rupture of a small blood-vessel near the ovaries in the envelope enclosing the ripe yolk, or in the upper part of the egg-duct.

EGG-BOUND.

When a hen becomes egg-bound, pass a feather dipped in olive-oil several times into the vent: then hold the bird with the vent over a jug of boiling water for a few minutes, after which place her on the ground, and she will make a strong effort to pass the egg. Should these measures fail, hold the bird on its back between your knees, with your finger and thumb of the left hand outside the bird's body, and push the egg carefully towards the vent, until it slightly protrudes; then prick the end of the egg, liberate its contents, and carefully break the shell and take it away. Afterwards oil the finger and pass it into the vent, and make sure that all the pieces are taken out.

DIPHTHERIC ROUP.

This mostly takes the form of a cheesy matter collecting about the windpipe. As the disease proceeds the breath becomes foul, the comb darkens, there is a difficulty to breathe, and the bird soon becomes emaciated and exhausted in condition. As a cure the same remedies as given in roup will be effective. In bad cases it is better to kill the fowl and burn the carcase. It is very contagious, and should be checked at the earliest possible moment.

GAPES.

Mostly affects chickens between the ages of one and three months. Its chief symptom is that of the chick opening and shutting its mouth. It is due to a thread-like parasitic worm which affects the windpipe, and causes the chick to gasp for breath. When discovered the coops or brooder-houses should be well disinfected, and the outside runs should be well limed, dug, and sown down. The affected birds should be re-

moved to fresh quarters. A small feather stripped all but the tip and dipped in Condy's Fluid, thrust down the windpipe and twisted round, will often assist in effecting a cure.

EGG-EATING.

The cause of this is an insufficient number of nests. A hen sits on the side of the nest waiting for one to come off, and frequently an egg is dropped to the ground and broken. This is readily eaten, and if once the hens have tasted it will not be long before they learn to break the shells for themselves. Another cause of the habit is the laying of soft-shelled eggs, which get easily broken. As a preventive have a plentiful supply of oyster-shell or some other sea-shell, and provide sufficient dark nests, each a deep box--say, 15 in. by 15 in.—with about 8 in. of straw-chaff: the egg will thus fall to the bottom, and cannot be seen by the hen, which will not trouble to look for it.

DOUBLE-YOKED EGGS.

This is partly due to the overfeeding of nitrogenous matters, among which condiments may be included. These in no shape or form should be fed to the laying hen. They simply overirritate the ovaries, and, although a few more eggs may be gathered when first given, a reaction sets in, and the hen soon falls a victim to disorder.

SOFT-SHELLED EGGS.

When condiments are used they play an important part in this trouble. Give ample oyster or other sea shell.

FEATHER-PULLING.

This is one of the most difficult habits to overcome. Usually it is the result of overcrowding and insufficient exercise. Birds that have free range seldom acquire this habit, and birds in full plumage are always the culprits. The most satisfactory plan is to take off the hooked end of the upper part of the beak with a sharp knife: this will prevent the bird securing a grip of the feather sufficiently to pull it out.

VENT-GLUT.

When there is an offensive discharge from the vent, kill all affected birds.

SORE ON MALE BIRD'S COMB WHICH CAUSES IT TO FALL OVER.

This is a matter of frequent inquiry. Dissolve one Chinosal tablet in half a breakfast-cup of water, and sponge the affected parts. If this is done in time the trouble will soon disappear.

CONSUMPTION (TUBERCULOSIS).

This disease is mostly caused by inbreeding, dirty surroundings, and bad ventilation. In this case particularly prevention is the best remedy. The symptoms are much the same as of liver-disease.

SCALY LEG, OR LAZY MAN'S TROUBLE.

This is chiefly due to wet and dirt, and is caused by a minute parasite which breeds under the scales of the fowl's leg, giving the bird an

unsightly appearance. Mix equal parts of kerosene, sulphur, and lard. A few applications will usually suffice.

FOWLS LOSING FEATHERS ON THE BACK.

This is another matter of frequent inquiry. It is caused by a vigorous male bird. Birds affected this way are mostly the strongest, and, as a rule, the best layers. The observant breeder will understand that such birds should be retained for breeding purposes, being nature's selection.

FOWLS' HEADS GOING BARE.

This is due to a parasite. Mix equal parts of sulphur and lard, and apply lightly to the affected parts.

BROKEN DOWN BEHIND.

This can occur in three different forms. Sometimes it is caused by over fat in old hens, which causes the abdomen to fall. It may also be due to rupture. Another, and the chief cause, is the misplacing of the oviduct, so that instead of the yolks falling in the oviduct when leaving the egg-cluster, they fall into the abdomen, and become a large solid mass. Birds thus affected should be killed.

POINTERS

In choosing a site for poultry-keeping the future growth of the plant should be kept in view.

Labour-saving is an important factor in profitable poultry-keeping.

The best way to learn poultry-keping is by practical experience, and studying the writings of practical men.

The best food-ration ever planned will fail to give a good egg-return if the birds are of a beef type, and the attendant a careless feeder.

Inbreeding or line-breeding from birds that have a sound constitution, if not carried to extreme, will not produce harmful results. Endeavour to select a male bird that is the son of a heavy laying hen, with good constitution, and an ancestry of good type layers.

Have movable perches: they are more easily kept clean.

A laying hen should have her food and drink at regular hours.

One fowl with scaly legs is apt to impart the trouble to others on the same roost.

Some people only feed their fowls when they are laying well: is it a wonder the birds die from the effects of vermin and disease?

The man who makes a success of poultry-keeping must l. ve his work, and make time to attend to his fowls.

Hens' crops without grit are like men's mouths without teeth. Neither the gritless crop nor the toothless mouth can do the necessary mastication.

Unfertilized eggs are much sweeter and better for table use, and will keep much longer than fertilized ones.

The overfeeding of maize to fattening birds will produce too much internal fat, which wastes when cooking, besides giving the flesh a yellow colour. Good white flesh should be aimed for, not superfluous fat.

If it pays at all to raise fowls for market, certainly it will pay to put them in the best possible condition before sending to market.

The poultry pay the grocery bills, the farmers' wives testify; yet not half as much attention is paid the birds as their earnings entitle them to.

The winter-time is the season for making money out of fowls. Every farmers' hens will lay during the summer, the natural laying season, when even the sparrows are laying.

High yearly records are artificial, and artificial means are necessary to get them.

A frequent question often asked is, Can a man make poultry-keeping pay? The answer is: Some men can and others cannot. The good poultryman is born, not made.

Every farmer should do his share towards producing the eggs the world needs, and see to it that he gets his share of the money it spends for them.

If there have been errors or mistakes during the period of incubation, they cannot be remedied on hatching-day.

The use of a nest-egg will often help a young pullet to make up her mind to lay in the nest instead of on the floor or in the corner of the poultry-house, and thus avoid the risks of egg-eating.

Either for hatching chicks in incubators or rearing them in brooders take a set of instructions from the old hen. She is past the experimental stage.

Troubles with chickens are difficult to remedy: it is better to prevent them.

Do not force the pullets into prematurity and bring them on to laying before they are fully grown and have attained maturity. Naturally the keynote of heavy egg-production is good birds, good feed and plenty of it, and clean houses to roost in.

Do not wait for vermin to appear. Keep the houses clean, also give them frequent applications of disinfectants.

The poultry business takes years to master. Like learning the violin, there is always more to follow.

"DON'TS" FOR POULTRY-KEEPERS.

Don't fail to gather eggs at least once a day.

Don't market eggs unless they are clean and inviting.

Don't forget that eggs are porous, and contaminating surroundings will spoil them.

Don't forget that if a brooding hen is allowed to sit on a fertilized egg for twelve hours the flavour is spoiled.

Don't forget that the sooner eggs are marketed the better.

Don't forget that the flavour of the egg is affected by the quality of the food given to hens.

Don't keep a male bird with hens that are not required to breed from.

Don't keep the water in the sun: it should be always sweet and clean.

Don't feed poultry at irregular intervals.

Don't have filthy nest-boxes; keep them disinfected, and have clean hay, straw, shavings, or pine-needles in them.

Don't have perches nailed, or built in step-ladder fashion, but have them on a level 12 in. to 18 in. from the ground.

Don't forget to breed from your best layers only.

Don't fail to fill your incubator and brooder lamps daily.

Don't send to market birds that are not in good condition.

Don't fail to work up a private trade if possible.

Don't fail to keep a record of the eggs laid during the year.

Don't neglect keeping fowlhouses dry, clean, and free from vermin.

Don't fail to let plenty of sunlight into your fowlhouse.

Don't fail to keep oyster-shell or lime, and sharp grit, always before your poultry.

Don't forget that long-legged birds are seldom good layers, and as a rule are deficient in breast-meat.

Don't breed from loose-feathered birds; the tight and abundantly feathered are usually the best layers.

Don't forget that the breeding-pen must be dry to get a good percentage of fertile eggs.

Don't fail to give your birds green feed if the grass has become long and rank.

Don't fail to grow all the green feed required if you have space.

Don't grow heavy-boned birds: it is meat that is wanted, not bone.

Don't forget that a medium-sized bird of its breed is generally the best layer: large birds are prone to fat.

Don't compel good layers to support the drones: an idle hen is never a good layer.

Don't waste time trying to cure persistent cases of disease.

Don't forget to feed chicks a little and often: the drier the food the better.

Don't keep an old hen because she has some peculiarity about her; there should be no sentiment about poultry-keeping when it is a question of making a living out of it.

MANGELS FOR SHEEP.

ALL the Moumahaki Farm ewes from the beginning of the lambing season have had a liberal supply of mangels. For such a purpose the value of this fodder cannot well be overestimated. It keeps up the flow of milk at a critical time, and the lambs themselves eat the mangels with relish at three weeks.

CORRESPONDENCE.

H. E. B., Matawai, writes,—

Would you kindly inform me through the columns of your *Journal* whether it is necessary, in making Bordeaux mixture from stock solutions, to stir the lime-mater before adding it to the diluted bluestone-water, or would the clear, settled lime-water do as well.

The Director of Orchards, Gardens, and Apiaries supplies the following reply :—

In making the ordinary lime-Bordeaux as advocated by this Department, it is necessary to stir the stock milk-of-lime solution thoroughly before adding it to the bluestone-solution. Of course, clear lime-water can be used to neutralize the copper-solution, and the name "lime-water Bordeaux" has been applied to Bordeaux made in this way. Lime-water Bordeaux has been largely used in Italy for many years past, and seems there to be preferred to the ordinary milk-of-lime formulas. In New Zealand, lime-water Bordeaux has not, up to the present, given uniformly good results.

A. E. H., Blenheim, writes,—

Could you through the columns of your *Journal* give the farmers of the country some practical methods for exterminating or checking the ravages of the caterpillar. This season the Marlborough district has suffered considerably from this pest, and I believe many other districts have also had a very bad time.

The Director of Fields and Experimental Farms replies,—

There are several native caterpillars that are the cause of wholesale destruction amongst grain and grass crops in certain parts of New Zealand, but the commonest is the New Zealand army-worm (*Melanchra composita*). Very little if any attempt has hitherto been made by the New Zealand farmer to cope with these pests, but the following extract from a recent number of *Dalgety's Review* shows the methods employed by Tasmanian farmers :—

"Farmers in different parts have had to keep a watchful eye on these agents of destruction, and when given an opportunity they deal out death to them by means of the farm-roller drawn by a couple of horses. Some have found that by covering the roller with old bags it greatly assists in the destruction. Others plough out furrows, and as the army of grubs progress they fall into the furrows, and are covered up by another. A plan that has been found to operate successfully has been to spray the headlands, especially if cocksfoot is included in the vegetation, with arsenate of lead. The caterpillars are very fond of cocksfoot and Italian ryegrass, and when it has been sprayed with the poison, which would not be present in sufficient quantity to harm stock, they fall dead in thousands—in fact, one might say millions. It is not an expensive method of combating the pest, and it is effective. One only needs to watch for the appearance of the grubs, and note their line of march, as it were, and be prepared to cross it with the spray. The only trouble to be met with is the stench given off by the dead grubs, which, however, only lasts for a few days. The benefits, on the other hand, far outweigh this temporary inconvenience."

During the past month a large party of Eltham farmers, organized by the local branch of the Farmers' Union, visited the Moumahaki Experimental Farm, and spent an educative and interesting day.

SHIPMENTS OF UNDERMENTIONED PRODUCE FROM NEW ZEALAND TO UNITED KINGDOM,

Compiled from Manifests of Vessels sailed during Respective Months of the Current and Preceding Seasons.

Month.		Mutton, Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bales.	Kauri-gum, Cases.	Sundry.
October,	1910	49,010	800	10,531	60,014	9,159	3,189	94,815	23,330	36,947	3,632	1,232	3,089	56 carcases pork.
	1909	*103,746*	*49,600*	*4,049*	*57,221*	*13,716*	*3,995*	..	*41,079*	*24,847*	*1,105*	*631*	*7,882*	..
November,	1910	62,926	29,877	5,554	105,759	27,749	55,551	76,594	331	28,646	6,850	2,300	4,339	911 carcases pork.
"	*1909*	*56,467*	*40,973*	*11,073*	*99,951*	*33,019*	*49,480*	..	*21,955*	*26,448*	*4,151*	*734*	*4,383*	..
December,	1910	82,405	157,172	13,155	182,051	67,162	59,080	..	..	9,716	4,524	109	5,363	686 carcases pork.
"	*1909*	*90,245*	*86,345*	*29,199*	*164,314*	*68,867*	*72,056*	..	*2,613*	*2,128*	*7,389*	*1,618*	*8,742*	..
January,	1911	175,337	287,120	13,568	90,405	46,375	127,199	..	16	399	15,234	3,302	7,094	590 carcases pork.
"	*1910*	*86,491*	*252,193*	*22,527*	*87,934*	*39,717*	*122,399*	*2,391*	*15,839*	*1,634*	*11,305*	*4,704*	*5,682*	..
February,	1911	242,090	450,406	24,924	86,368	46,667	70,030	23,694	200	..	4,428	1,302	2,113	1,369 carcases pork.
"	*1910*	*196,093*	*414,408*	*23,798*	*97,766*	*62,192*	*102,182*	*4,724*	*8,600*	..	*4,223*	*2,314*	*4,827*	*1,719* "
March,	1911	264,297	665,822	26,657	45,912	40,668	58,362	40,276	..	..	3,650	1,583	8,982	2,408 carcases pork.
"	*1910*	*222,058*	*413,179*	*22,134*	*77,319*	*42,029*	*64,266*	*2,899*	*3,636*	..	*9,152*	*2,490*	*2,959*	*798* "
April,	1911	172,503	491,413	19,106	14,823	33,411	42,917	38,456	6	..	9,233	1,827	2,577	2,431 carcases pork.
"	*1910*	*209,120*	*559,166*	*29,355*	*46,524*	*44,032*	*32,920*	*21,855*	*1,934*	*12*	*10,179*	*2,951*	*4,250*	*627* "
May,	1910	310,196	622,232	38,276	9,588	28,384	25,123	81,052	..	3,010	10,017	2,346	3,150	1,293 carcases pork.
"	*1909*	*261,886*	*675,070*	*39,961*	*4,307*	*17,508*	*39,259*	*135,346*	*139,297*	*3,500*	*6,171*	*972*	*2,473*	..
June,	1910	299,596	555,777	60,286	485	17,963	21,260	13,707	..	8,988	6,180	2,684	7,104	658 carcases pork.
"	*1909*	*108,094*	*302,721*	*29,029*	*6*	*12,406*	*12,157*	*88,974*	*223,563*	*3,500*	*1,768*	*790*	*3,762*	..
July,	1910	249,906	334,753	71,160	..	595	12,816	20,604	1,106	8,649	6,695	1,437	8,272	2,448 carcases pork.
"	*1909*	*164,437*	*231,053*	*31,929*	*1,479*	*3,650*	*22,471*	*77,909*	*170,701*	*5,473*	*4,429*	*633*	*10,260*	..
August,	1910	94,468	97,899	16,440	634	..	5,381	33,970	273	22,629	1,378	720	6,793	362 carcases pork.
"	*1909*	*63,219*	*117,316*	*41,029*	*3,601*	*1,721*	*6,575*	*27,207*	*234,998*	*9,149*	*2,348*	*1,286*	*887*	..
September,	1910	104,925	26,416	8,420	22,644	41	6,539	40,876	3,863	7,721	2,680	597	1,682	255 carcases pork.
"	*1909*	[illegible]	[illegible]	[illegible]	[illegible]	*974*	*6,575*	*1,040*	*62,372*	*40,006*	*1,352*	*484*	*10,325*	..

HEMP AND TOW GRADING RETURNS.

APRIL, 1911.

Hemp.—The total number of bales graded was 6,478, as compared with 14,528 for the corresponding month of last year, a decrease of 8,050 bales. For the twelve months ending 30th April the number graded was 105,478, as compared with 112,000 for the previous twelve months, or a decrease of 6,522 bales. Worked out on a percentage basis the quantity of each grade dealt with during the month was as follows: Superior, nil; fine, 4·66; good fair, 48·42; fair, 39·8; common, 5·82; rejected, 0·82; condemned, 0·68: total, 100.

Tow.—During the month 1,590 bales were dealt with, as compared with 4,515 for the corresponding month of last year, a decrease of 2,925 bales.

HEMP AND TOW GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF APRIL, 1911.

Hemp.

Port.	Superior.	Fine.	Good Fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	79	298	116	23	44	560
Napier ..	..	..	..	..	..	..	..	..
Foxton ..	..	75	1,408	1,001	88	30	..	2,602
Wellington ..	..	117	1,540	1,098	7	..	..	2,762
Blenheim ..	..	..	..	..	..	..	..	..
Picton ..	..	97	..	..	..	..	..	97
Lyttelton ..	..	..	..	..	..	..	..	..
Dunedin ..	..	12	45	49	162	..	..	268
Bluff ..	..	..	65	120	4	..	..	189
Totals ..	..	301	3,137	2,566	377	53	44	6,478
Percentages of total	..	4·66	48·42	39·6	5·82	0·82	0·68	100

Tow.

Port.		First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
		Bales.	Bales.	Bales.	Bales.	Bales.
Auckland	..	5	57	47	14	123
Napier ..	..	..	..	..	..	..
Foxton ..	..	296	294	84	5	379
Wellington	..	205	476	..	..	681
Blenheim	..	..	..	..	..	..
Picton ..	..	29	..	..	..	29
Lyttelton	..	..	..	..	..	..
Dunedin	..	..	11	..	..	11
Bluff ..	..	..	..	67	..	67
Totals	..	535	838	198	19	1,590

THE BRITISH PRODUCE-MARKET.

High Commissioner's Cabled Reports.

The Commerce and Tourists Division of the Department of Agriculture, Commerce, and Tourists has received the following cablegrams from the High Commissioner for New Zealand, London. (Note.—All quotations, unless otherwise stated, are average market prices on spot.)

29th April, 1911.

Mutton.—The market is very dull. River Plate is in large supply, and is being strongly pushed for sale. Canterbury 3⅝d., North Island 2⅞d., per lb.

Lamb.—The market is depressed. Canterbury 4½d., other than Canterbury 4d., River Plate 3⅝d., per lb.

Beef.—The market is quiet. New Zealand hinds 3¾d., fores 2⅝d., per lb.

Butter.—The market has declined 4s. for Danish and Siberian, and is unchanged for colonial. Choicest New Zealand 109s., Australian 102s., Danish 112s., Siberian 98s., per cwt.

Cheese.—The market is quiet, and prices slightly weaker. New Zealand 61s. per cwt.

Hemp.—The market is quiet, but rather steadier. New Zealand good fair on spot £20, fair grade £19 5s., per ton. Forward shipments at the same price. Fair current Manila on spot £19, forward shipment £19 15s., per ton. The output from Manila for the week was 25,000 bales.

Wheat.—The market is quiet but steady. New Zealand long-berried wheat on spot, *ex* granary, 32s., short-berried 31s. 6d. (nominal), per quarter of 496 lb.

Oats.—There is a general and active demand. New Zealand oats, short sparrow-bills, *ex* granary, on spot 20s., per quarter of 384 lb.; Danish, 17s. 6d., per quarter of 320 lb.

Beans.—There is more demand. New Zealand beans, f.a.q., old crop, 35s. per 504 lb.

Peas.—The market is firm, but demand only moderate. New Zealand peas (partridge), 44s. per 504 lb.

6th May.

Mutton.—The market is depressed, as the result of heavy arrivals. Canterbury 3½d., North Island 2⅞d., per lb.

Lamb.—There is a better demand, but stocks are heavy. Canterbury 4⅜d., other than Canterbury 4d., per lb.

Beef.—The market is steady. Supplies of American chilled beef are small. New Zealand hinds 3⅞d., fores 2⅞d., per lb.

Pork.—The ruling price for New Zealand pork is 5¼d. per lb.

Butter.—The market is slightly weaker, with a lessened demand. Buyers are holding back expecting prices to go lower. Choicest New Zealand 108s., Australian 100s., Danish 112s., Siberian 100s., per cwt.

Cheese.—The market is firm, with an improved demand. New Zealand, 62s. per cwt.

Hemp.—The market is quiet but steady. New Zealand good fair on spot £20, fair grade £19 10s., fair current Manila £19 10s., per ton. Forward shipments about the same. The output from Manila for the week was 23,000 bales. The stock of New Zealand hemp is 662 tons.

Cocksfoot-seed.—The market is very firm. There are light stocks on hand. Bright New Zealand seed weighing 17 lb. per bushel, 77s. per cwt.

Wool.—The market remains firm.

Mutton and Lamb.—River Plate shipments received during the month of April, 1911, are as follows :—

	Mutton. Carcases.	Lamb. Carcases.
London	117,768	30,147
Liverpool	137,419	49,078
Hull	680	569
Cardiff	11,025	4,150
Southampton	21,018	2,722
Bristol	11,176	..
Plymouth	759	36
	299,845	86,702
April, 1910	225,047	84,315

LONDON WOOL-SALES.

The Commerce and Tourists Division of the Department of Agriculture, Commerce, and Tourists has received the following cablegram from the High Commissioner for New Zealand, dated London, 9th May, 1911, regarding the opening of the third series of the colonial-wool sales :—

"The wool-sales have commenced. There is a general and active demand for all qualities. Trade is good at Home and on the Continent. Merinos, fine crossbreds, medium crossbreds, ¼d. per lb., coarse ½d. per lb., advance."

The estimated values of New Zealand wools at the close of the second series of colonial-wool sales held in London on the 1st April, 1911, were as follows: Superior merino, 1s. to 1s. 2d. ; medium, 10d. to 11½d. ; inferior, 8d. to 9½d. ; fine crossbreds, all grades, 11½d. to 1s. 2d. ; medium, 9d. to 11d. ; coarse, 8½d. to 10d.

THE WOOL EXPORT.

The following table, prepared by Messrs. Dalgety and Co., shows the export of wool from the Dominion during the month of April :—

Towns.	April, 1911.	Total for Ten Months.	Corresponding Ten Months, 1910.
	Bales.	Bales.	Bales.
Invercargill	1,857	24,032	27,022
Dunedin	1,121	33,593	37,448
Oamaru	1,506	7,801	7,492
Timaru	4,357	31,236	30,632
Christchurch	7,040	74,481	83,038
Blenheim	1,343	13,183	8,511
Nelson	25	3,088	3,684
Wellington	2,883	110,312	117,415
Wanganui	1,632	21,529	19,250
Waitara	979	6,706	4,186
Napier	2,169	60,197	75,630
Gisborne	1,193	39,696	40,231
Auckland	841	23,653	23,213
..	26,946	449,507	477,752